Fishery Data Series No. 16-07

Characterization of the 2014 Salmon Run in the Kuskokwim River Based on the Test Fishery at Bethel

by

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and

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February 2016

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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TABLE OF CONTENTS

Page

lIST OF TABLES ii
LIST OF FIGURES ii
LIST OF APPENDICES iii
ABSTRACT 1
INTRODUCTION 1
Fishery Description 2
Project Background 2
OBJECTIVES 3
Tasks 3
METHODS 4
Field Operations 4
Test Fishing Index 5
Age, Sex and Length Composition 6
Climatological and Stream Observations 7
RESULTS 7
Operations 7
Abundance Indices and Run Timing 7
  Chinook Salmon 7
  Sockeye Salmon 8
  Chum Salmon 8
  Coho Salmon 8
Climatological and Stream Observations 8
DISCUSSION 9
Abundance Index 9
  Chinook Salmon 9
  Sockeye Salmon 9
  Chum Salmon 9
  Coho Salmon 10
CONCLUSION 10
ACKNOWLEDGEMENTS 11
REFERENCES CITED 11
TABLES AND FIGURES 13
APPENDIX A. BETHEL TEST FISHERY DRIFT SCHEDULE 29
APPENDIX B: HISTORICAL CHINOOK SALMON DATA 31
APPENDIX C: HISTORICAL SOCKEYE SALMON DATA 35
APPENDIX D: HISTORICAL CHUM SALMON DATA 41
APPENDIX E: HISTORICAL COHO SALMON DATA 49
APPENDIX F: HISTORICAL CLIMATOLOGICAL DATA 55

LIST OF TABLES

Table		Page
1	Catch, daily mean tidal catch per unit effort (CPUE), cumulative mean tidal CPUE, and percent passage for the Bethel test fishery, 2014.	14

LIST OF FIGURES

Figure		Page
1	Map of Kuskokwim Management Area including commercial fishing Districts W-1, W-2, W-4, and W-5.	17
2	District 1 (also known as District W-1), the Kuskokwim commercial salmon management area.	18
3	Bethel test fishery drift Stations 1, 2, and 3.	19
4	Typical profile of the Kuskokwim River 4 miles upstream of Bethel, illustrating the area covered by gillnets used in the Bethel test fishery.	20
5	Chinook salmon daily mean tidal catch per unit effort (CPUE) indices for Bethel test fishery, 2014.	21
6	Sockeye salmon daily mean tidal catch per unit effort (CPUE) indices for Bethel test fishery, 2014.	21
7	Chum salmon daily mean tidal catch per unit effort (CPUE) indices for Bethel test fishery, 2014.	22
8	Coho salmon daily mean tidal catch per unit effort (CPUE) indices for mean Bethel test fishery, 2014.	22
9	Historical daily surface water temperature of the Kuskokwim River at the Bethel test fishery site, 2014.	23
10	Historical daily water clarity measurements of the Kuskokwim River at the Bethel test fishery site, 2014.	24
11	Chinook salmon cumulative mean tidal CPUE indices for years 2008–2014, Bethel test fishery.	25
12	Sockeye salmon cumulative mean tidal CPUE indices for years 2004–2014, Bethel test fishery.	26
13	Chum salmon cumulative mean tidal CPUE indices for years 2004–2014, Bethel test fishery.	27
14	Coho salmon cumulative mean tidal CPUE indices for years 2004–2014, Bethel test fishery.	28

LIST OF APPENDICES

Appendix		Page
A1	Drift schedule used to determine the sequence of mesh sizes to be fished during each tidal drift series of the Bethel test fishery, 2012 and 2013.	30
B1	Historical daily mean tidal catch per unit effort for Chinook salmon catches in the Bethel test fishery, 2009–2014.	32
B2	Historical cumulative mean tidal catch per unit effort for Chinook salmon catches in the Bethel test fishery, 2008–2014.	33
B3	Historical percent passage of Chinook salmon at the Bethel test fish site, 2008–2014.	34
C1	Historical daily mean tidal catch per unit effort for sockeye salmon catches in the Bethel test fishery, 2004–2014.	36
C2	Historical cumulative mean tidal catch per unit effort for sockeye salmon catches in the Bethel test fishery, 2004–2014.	38
C3	Historical percent passage of sockeye salmon at the Bethel test fish site, 2004–2014.	40
D1	Historical daily mean tidal catch per unit effort for chum salmon catches in the Bethel test fishery, 2004–2014.	42
D2	Historical cumulative mean tidal catch per unit effort for chum salmon catches in the Bethel test fishery, 2004–2014.	44
D3	Historical percent passage of chum salmon at the Bethel test fish site, 2004–2014.	46
E1	Historical daily mean tidal catch per unit effort for coho salmon catches in the Bethel test fishery, 2004–2014.	50
E2	Historical cumulative mean tidal catch per unit effort for coho salmon catches in the Bethel test fishery, 2004–2014.	52
E3	Historical percent passage of coho salmon at the Bethel test fish site, Bethel test fishery, 2004–2014.	54
E1	Historical daily mean tidal catch per unit effort for coho salmon catches in the Bethel test fishery, 2004–2014.	50
E2	Historical cumulative mean tidal catch per unit effort for coho salmon catches in the Bethel test fishery, 2004–2014.	52
E3	Historical percent passage of coho salmon at the Bethel test fish site, Bethel test fishery, 2004–2014.	54
F1	Historical daily surface water temperature (C) of the Kuskokwim River at the Bethel test fish site, 2004–2014.	56
F2	Historical daily water clarity measurements of the Kuskokwim River at the Bethel test fish site, 2004–2014.	58

ABSTRACT

Annual abundance indices and run timing of adult Chinook *Oncorhynchus tshawytscha*, sockeye *O. nerka*, chum *O. keta*, and coho *O. kisutch* salmon returning to the Kuskokwim River have been assessed by the Bethel test fishery since 1984. In 2014, the Bethel test fishery operated from June 1 through August 24. A series of timed drifts using 5.375 in (13.6 cm) and 8.0 in (20.3 cm) stretch mesh gillnets were made at 3 stations across the river channel. Each series of drifts began approximately 1 hour following each high tide throughout the fishing season. Mean tidal catch per unit effort (CPUE) was calculated for each species and served as an index of abundance. The cumulative mean tidal CPUE was compared to information from previous years to determine relative salmon abundance and run timing to help direct subsistence and commercial management decisions. The final cumulative CPUE indices for 2014 were 650 Chinook, 1,367 sockeye, 6,345 chum, and 4,697 coho salmon. Run timing of Chinook salmon indicated 50% passage on June 15; sockeye salmon achieved 50% passage on July 1; chum salmon achieved 50% passage on July 2; and coho salmon achieved 50% passage on August 9.

Key words: Chinook salmon *Oncorhynchus tshawytscha*, sockeye salmon *O. nerka*, chum salmon *O. gorbuscha*, coho salmon *O. kisutch*, Bethel salmon test fishery, run timing, relative abundance, commercial fishery, subsistence fishery, stocks of concern, escapement, drift gillnet, index, water level, catch per unit effort, CPUE, age, sex, and length, ASL composition, Kuskokwim River.

INTRODUCTION

Kuskokwim River salmon fisheries are currently managed according to the *Kuskokwim River Salmon Management Plan* (5 AAC 07.365) (Management Plan) adopted by the Alaska Board of Fisheries (BOF) in January 2013. The purpose of this plan is to provide guidelines for management of the Kuskokwim River fishery that will result in the sustained yield of salmon stocks large enough to meet escapement goals, provide amounts reasonably necessary for subsistence, and provide for fisheries other than subsistence. The management of this salmon fishery is confounded by unknown variables such as run size and migratory timing, harvest of mixed stocks, overlapping multi-species salmon runs, allocation issues, and large size of the Kuskokwim River drainage (Figure 1). To address these management objectives, managers rely on subsistence harvest reports, test fishery catch per unit effort (CPUE) index summaries, commercial harvest catch rates, and reports from weirs, and aerial survey programs. This information is used to attempt to adequately characterize inseason migratory timing, run strength, and escapement of Pacific salmon *Oncorhynchus* spp. in the Kuskokwim River drainage.

The Bethel test fishery (BTF) provides a CPUE index that fishery managers compare to previous year's indices to evaluate inseason salmon run timing and relative abundance. The current year CPUE index, when compared to prior year indices, along with associated subsistence reports, weir, and aerial survey data, are used to assess salmon run strength. Comparison of CPUE data between years should be approached cautiously because of an array of factors affecting salmon catchability at the test fishery site. Such factors include, but are not limited to, water level and clarity, water temperature, height of the flooding tides, weather conditions, river channel morphology and hydrology, fish size relative to gillnet mesh size, net saturation effects, and test fishery crew technique.

The location of the BTF within the Kuskokwim River drainage is important to salmon managers for providing some of the first information on the development of salmon runs in a given year. Historically managers relied on test fisheries, commercial catch statistics, and informal reports from subsistence and sport fishermen to gauge inseason salmon run abundance. In 1987, the directed Chinook salmon *O. tshawytscha*, commercial fishery was discontinued in the Kuskokwim River to provide for a sustainable subsistence harvest and maintain an average spawning escapement (Francisco et al. 1989). In the absence of a June commercial fishery, early

inseason salmon run assessment information was limited primarily to test fishery data and informal subsistence harvest reports.

FISHERY DESCRIPTION

Mixed stocks of Chinook, sockeye *O. nerka*, chum *O. keta*, and coho *O. kisutch* salmon that return to the Kuskokwim River are subjected to subsistence and periodic commercial fishing. Prior to 2004, the commercial fishery was directed toward chum and coho salmon. Sockeye salmon, generally less abundant, were considered incidental in the commercial harvest until 2004, when the BOF accepted a proposal for a commercial harvest guideline level of up to 50,000 sockeye salmon for the Kuskokwim River (Whitmore et al. 2008). Chinook salmon are the principal target species of subsistence fishermen; however, chum, sockeye and coho salmon also contribute significantly to the subsistence harvest. Harvests of pink salmon *O. gorbuscha* are negligible, in part, because of the lack of both commercial markets and interest by subsistence fishermen.

PROJECT BACKGROUND

From 1966 through 1983, ADF&G conducted a set gillnet test fishery in the lower portion of the Kuskokwim River near an abandoned fish camp called Kwegooyuk. At that site, the river was approximately 5 to 7 km (3 to 4 mi) wide and had 2 major channels, 1 channel along the east shore and 1 along the west shore. The river channels were separated by soft sandy shoals that were mostly flooded at high tide. It was also difficult to predict which side, east shore or west shore, would be the "main" river channel in a given year and it appears this may have alternated several times during the history of the Kwegooyuk test fishery project (Huttunen 1984). In that expansive body of water, the Kwegooyuk test fishery gillnets, 27 fathoms (49 m) in length, were set from the east shore just upstream of the lower boundary of District 1 and fished 24 hours a day (Molyneaux 2003; Figure 2).

The goals of the Kwegooyuk test fishery were to describe run timing and provide an index of abundance for Chinook, sockeye, and chum salmon, similar to the present day BTF. Managers believed that run timing was adequately described by the Kwegooyuk test fishery, but the project did not provide a satisfactory index of run abundance. This problem was attributed to fluctuations in the migratory route of salmon between the east river and west river channels as influenced inseason by changes in weather patterns and tidal stages, and between seasons by alterations in river channel morphology. The Kwegooyuk test fishery was also a poor predictor of Chinook and chum salmon catches in the District 1 commercial fishery (Huttunen 1984). Because of the remoteness of the test fishery site, daily catches of fish were not able to be sold or distributed to the public for subsistence uses. This made discarding of the daily catches difficult or impossible, resulting in unavoidable waste that was not acceptable to ADF&G, local residents, and the industry (Molyneaux 2003).

In an effort to provide a more reliable index of relative abundance and run strength, and to provide a better avenue for the sale of test fishery catches, a drift gillnet test fishery program near Bethel was evaluated in July 1983. This program ran concurrently with the Kwegooyuk test fishery. The focus was on the use of drift gillnets in a narrower river channel of the mainstem Kuskokwim River near Bethel. The objectives of the 1983 drift gillnet test fishery were to assess the feasibility of collecting run timing and abundance information for coho salmon. The new site was in the mainstem Kuskokwim River about 5 km (3 mi) upstream from Bethel, just above the

boundary line separating Subdistricts 1-A and 1-B (Figure 2). The river was approximately 1 km (0.5 mi) wide at the new location and had a single major channel that allowed drift gillnets to collect CPUE information at selected stations across the entire channel width. Four small channels circumvent the site (Steamboat, Straight, Church, and Napaskiak sloughs), but their influence on the test fishery was assumed negligible (Figure 3). The new test fishery site was also conveniently located in close proximity to local fish processors for the timely distribution and sale of daily catches. Conclusions from the 1983 program evaluation were that the drift gillnet test fishery at Bethel was viable and offered a more reliable means of monitoring salmon run timing and abundance than the Kwegooyuk test fishery. The Kwegooyuk set gillnet program was then discontinued after 1983 and replaced with a multiple-mesh drift gillnet project referred to as the Bethel test fishery (Huttunen 1984).

Operating at a point upriver of most commercial and subsistence harvest meant that instead of indexing total run abundance, the objective of the test fishery was modified to provide an index of abundance for salmon at a point midway in the commercial fishing district. This distinction was important because downriver commercial and subsistence harvests could not be accounted for in the test fishery indices. The variability in the annual exploitation rates of the subsistence and commercial fishery are affected by many factors, including management actions, changes in gear efficiency, regulations designed to alter harvest efficiency, variability in fishing patterns (length and frequency of openings), changes in water level, river entry patterns of salmon, and the occurrence of commercial fishermen strikes. Therefore it was only appropriate to use test fishery CPUE as an indicator of salmon abundance and run timing at Bethel when compared to CPUE information from previous years to help direct subsistence and commercial fishery management decisions. Inseason assessment during 2014 was limited to historical comparisons of Chinook salmon CPUE data from 2008 to 2013 due to identification of a change in catchability with a new web type utilized in BTF gillnet manufacturing.

Since 1999, with the decline of salmon abundance and weak commercial salmon markets, the harvest of salmon from the Kuskokwim River has become more stable. Commercial fishery openings occur more often in late June or early July well past the majority of the Chinook and sockeye salmon runs and near the peak of the chum salmon return. Salmon harvests taken in June are primarily for the purpose of subsistence use; targeting Chinook, sockeye, and some chum salmon. Subsistence harvests have remained relatively stable for the past 15 years (Brazil et al. 2011). Given a stable harvest, the Bethel test fishery has evolved into a tool used by fishery managers to gather insight into salmon run abundance.

OBJECTIVES

1. Determine a tidal mean index expressed as CPUE and a cumulative daily CPUE index for Chinook, sockeye, chum, and coho salmon at the Bethel test fishery site from June 1 through August 24.
2. Estimate relative run abundance and timing of Chinook, sockeye, chum, and coho salmon at the Bethel test fishery site by comparison of historical test fishery information.

TASKS

1. Collect age, sex, and length (ASL) data from all Chinook salmon caught in the test fishery in order to provide a general characterization of the composition of the run.

2. As part of a separate sockeye salmon study, drift an 11.6 cm drift gillnet after BTF operations and collect ASL, girth, and genetic samples from sockeye salmon.

METHODS

FIELD OPERATIONS

The methods and location used in 2014 BTF operations were similar to those used since 1984 (Huttunen 1985). Following each high tide, a series of gillnet drifts (drift session) were conducted at 3 stations in the Kuskokwim River approximately 5 km (3 mi) upstream of Bethel, where Straight Slough diverges from the main river channel (Figure 3). A 3-person crew performed drifts using a 6.1 m (20 ft) skiff and two 90 m (50 fathom) drift gillnets, 1 each consisting of 20.4 cm (8.0 inch) and 13.7 cm (5.375 inch) mesh. Each drift session began approximately 1 hour after the published high slack tide (high tide) for Bethel to ensure all drifts were conducted in water flowing downstream. If weather conditions and high tide magnitude caused a delay in the ebbing of the tide, the time drift sessions began was delayed. Two drift sessions were completed daily. During each drift session, 2 of the 3 drift stations were fished once with the 8.0-inch and once with the 5.375-inch mesh gillnet for a total of 4 drifts per session. A drift schedule was used to determine the sequence drift stations were to be fished and mesh sizes to be fished (Appendix A1). This design dictates that 1 of the 3 stations was fished twice during each drift session, once with each mesh size. The duration of each drift was approximately 20 minutes and the mean fishing time was calculated as half the time it took to deploy and retrieve the gillnet, plus the time the gillnet was fully deployed. The distance of each drift varied depending on water and channel conditions, but the distance was generally less than 3 km (2 mi). To avoid conflicting with commercial fishermen, the test fishery did not operate when commercial fishing was in progress in Subdistrict 1-A (Figure 2).

The river channel is approximately 12 m (36 ft) deep at the main channel and 320 m (1,050 ft) wide as measured near the downriver end of the test fishery site (Figure 4). Gillnets used in the test fishery generally sampled the upper half of the water column; however, at Station 1 the inshore end of the gillnet dragged along a section of sand bar (Figure 4). At Station 3 the crew deployed the inshore end of the gillnet approximately 8 m (24 ft) offshore to avoid snags along the channel edge. As the Station 3 drift progressed, it typically moved towards the center of the channel and overlapped with Station 2.

Drift sessions began the second tide on June 1 and continued through the second tide on August 24 during the 2014 season. Through July 15, 2 different mesh sizes were used in the test fishery; the first 2 drifts of the drift session were conducted with the 8.0-inch mesh gillnet, and the second 2 drifts were performed with the 5.375-inch mesh gillnet. Different mesh sizes were used because the larger mesh catches larger Chinook salmon, whereas the smaller mesh is more effective on smaller Chinook and other salmon species. Beginning July 16 the use of the 8.0-inch mesh gear was discontinued for the remainder of the season because, typically, by mid-July the Chinook salmon migration in the lower Kuskokwim River is essentially over.

Until 1990, 4 drifts continued to be conducted at the 3 stations after mid-July using only the 5.375-inch mesh gillnet. The fishing schedule was used to determine the drift sequence as well as the station that received the duplicate drift. Results of the duplicated drifts were then averaged. However, Molyneaux (1991) found the duplicated fourth drift was unnecessary and it was discontinued beginning in 1990. Prior to 2001, the test fishery had an outlet for the disposal of

the catch through sales to local processors. Beginning in 2001, because of continuing poor Chinook and chum salmon returns, a reduction of commercial fishing during June and July, and a decline in the salmon market, sales to local processors became sporadic. The disposal of BTF caught salmon became an increasing problem. In 2003, inseason adjustments to the standard operating procedures were made as to when the use of the 8.0-inch mesh gear was discontinued for the remainder of the season. The change in procedures became necessary because of a trend of increasing Chinook and chum salmon abundance and the inability to sell chum salmon to local processors or distribute them to subsistence users or local charities. Additional procedural adjustments were made in the use of the 5.375-inch mesh gillnet by fishing only 2 of the 3 stations per drift session during the period of high chum salmon abundance. This procedure was a change from pre-2003 years when the use of the 5.375-inch gear was increased to fishing all 3 stations. Further adjustments to the fishing schedule have been made in recent years by discontinuing operations for a period of consecutive tides to address the chum salmon catch disposal problem. Restrictive management actions over the past 4 years have subsequently made distribution of BTF catch to subsistence salmon users more reliable and eased concerns of fish disposal. In 2014, the 5.375-inch mesh gillnet fished all 3 stations beginning July 16.

The 8.0 inch and 5.375-inch mesh gillnets were 35 meshes (6.7 m) and 45 meshes (5.8 m) in depth. The webbing was manufactured by Momoi Fishing Net MFG. Co., LTD.[1] and both nets were hung at a 2:1 ratio to a finished length of 50 fathoms (90 m). The 8.0 inch mesh webbing was MT-83, a multi-fiber mono twist 1.5 X 16 strand twine, and the color code was R-46R (medium brown/green). The 5.375-inch webbing was MST-33, a multi-fiber mono super twist 1.5 X 8 strand twine, and the color code was SH-3 (light green).

The catch for each drift was tallied by species and by station. At the end of each drift session, the catch was either donated to charities or individuals desiring the fish for subsistence purposes. The data were entered into a Microsoft Excel™ computer program for analysis and recorded in the Bethel office log.

TEST FISHING INDEX

The actual salmon catch for each drift was converted to a drift CPUE and then averaged, producing a tidal CPUE to enhance the comparability of catch results. This was accomplished by converting the number of fish caught in the variable net length and mean fishing time of each drift to the number of fish that would be caught by 100 fathoms (180 m) of net fished for 60 minutes. This standardization of net length and fishing time has been used in many gillnet test fisheries conducted by ADF&G (Meacham 1978; Waltemeyer 1983).

Denote that

i = date of test fishery

t = tide of test fishery

s = test fishery strata (location)

m = mesh of the net used

[1] Product names used in this report are included for scientific completeness, but do not constitute a product endorsement.

$f_{i,t,s,m}$ = length of the net used

$t1_{i,t,s,m}$ = time of starting net deployment

$t2_{i,t,s,m}$ = time of net fully deployed

$t3_{i,t,s,m}$ = time of starting net retrieval

$t4_{i,t,s,m}$ = time of net fully retrieved.

$C_{i,t,s,m}$ = the number of fish by species caught by each drift

$n_{i,t}$ = total number of drift deployed per tide per day

n_i = the number of tides test fished per day

For each drift, mean fishing minutes were calculated as

$$\bar{T}_{i,t,s,m} = \frac{1}{2}(t3_{i,t,s,m} + t4_{i,t,s,m} - t2_{i,t,s,m} - t1_{i,t,s,m}), \quad (1)$$

and its standardized drift CPUE ($I_{i,t,s,m}$) per 100 fathom net length and 60 minutes of fishing effort was calculated as

$$I_{i,t,s,m} = 100 \times 60 \cdot \frac{C_{i,t,s,m}}{f_{i,t,s,m} \cdot \bar{T}_{i,t,s,m}}. \quad (2)$$

Daily per tide CPUE was calculated as

$$I_{i,t} = \frac{\sum_s \sum_m I_{i,t,s,m}}{n_{i,t}}. \quad (3)$$

For calculation of per tide CPUE, both 8.0 inch and 5.375 inch mesh nets were used for Chinook salmon, and only 5.375 inch mesh nets were used for sockeye, chum, and coho salmon.

Standardized daily CPUE per 2 tides calculated as

$$I_i = 2 \cdot \frac{\sum_t I_{i,t}}{n_i}. \quad (4)$$

AGE, SEX AND LENGTH COMPOSITION

Chinook salmon ASL data collected from BTF has been sporadic over the years. Declining commercial fishing activity in the Kuskokwim River in the late 1990s and early 2000s had precluded ASL sample collection for Chinook salmon. As a result, collection of ASL data from BTF was implemented in 2001 through 2007. ASL data collection was discontinued in 2008, 2009, and 2010 because of time and fiscal constraints. Chinook salmon ASL data collection was resumed in 2011 through 2014.

ASL sampling of Chinook salmon was conducted for all drifts and for all drift sessions. All Chinook captured were typically sampled during the time when the next sequential drift was being conducted, although during periods of high catches additional time was taken between drifts to sample. After sampling, these fish were then placed in a tote located in the boat.

Standard sampling procedures as described by Molyneaux (et al. 2010) were followed to remove a minimum of 3 scales from the preferred area of the fish. Scales were mounted on labeled gum cards and each card was identified with a unique card number. Sex was positively determined by slitting the belly of each fish sampled and visually examining the gonads. Length was measured to the nearest millimeter from the mideye to tail fork using standardized calipers. Upon completion of each drift session, sex-length data were transferred to an Excel worksheet. Scale cards and logged data were analyzed and published by Kuskokwim research staff in Bethel and Anchorage. Original ASL scale cards, scale acetates, and sex-length data logs were archived at the ADF&G office in Anchorage.

CLIMATOLOGICAL AND STREAM OBSERVATIONS

Climatological conditions were recorded during the first drift of each drift session. Cloud cover was estimated by percent sky covered; observed precipitation was noted; wind direction was noted and speed was estimated in miles per hour; air and surface water temperatures were recorded in degrees Celsius; water clarity was measured in meters using a standardized Secchi disk. The daily water surface temperature value recorded an Excel worksheet was the lowest value for all high tides for that day. The daily value for depth of water clarity recorded on an Excel worksheet was the highest value for all tides for that day. Although this information is not used in the assessment of salmon run abundance and run timing, collection of these data continues as part of the sampling routine.

RESULTS

OPERATIONS

During the 2014 season BTF operated from June 1 through the second tide on August 24 and the first salmon were caught on June 1 (Table 1). During the 85-day period there were 164 high tides. BTF conducted 579 drifts caught 497 Chinook, 507 sockeye, 2,549 chum and 2,880 coho salmon (Table 1). Chinook, sockeye, and chum salmon migrations have primarily all passed the BTF site before the project was concluded, but catches of coho salmon persisted through the final drift session. Six of the days during the project's operational period had only 1 high tide occurring during that day. No tides were missed during the 2014 season. No natural or anthropogenic events inhibited daily operations throughout the 2014 season. Beginning May 27 the BTF project undertook a preseason evaluation in response to an early spring and verbal reports from the public that salmon were being caught. This was an observational period only, any salmon caught were not integrated into the standard operational period indices and the catch data will not be published. The 2014 season went as planned with very little in the way of difficulties that affected the accuracy and efficiency of the project.

ABUNDANCE INDICES AND RUN TIMING

Chinook Salmon

The first Chinook salmon in 2014 was caught in BTF on June 1. The peak daily CPUE index (daily index) of 37 occurred on June 13 and the cumulative daily CPUE index (cumulative index) through August 24 was 650. Based on the cumulative index, the central 50% of the run passed the BTF site between June 9 and June 22 and the midpoint occurred on June 15, 8 days earlier than the average date of June 23 (Table 1; Appendix B3). Daily indices tracked above the

5-year average throughout the majority of the return (Figure 5; Appendix B1). The season total cumulative index was the second highest for the time period of 2008–2013 (Appendix B2.)

Sockeye Salmon

The first sockeye salmon in 2014 was caught in BTF on June 10. The peak daily CPUE index of 153 occurred on July 3 and the cumulative CPUE index through August 24 was 1,367. Based on the cumulative CPUE index, the central 50% of the sockeye salmon run passed the BTF site between June 27 and July 4, with the midpoint of passage occurring on July 1 (Table 1). The season total cumulative index was below the 10-year average of 1,722 (Appendix C2). The central 50% of the sockeye salmon passage fell within the 10-year average range of dates (June 24 to July 5) with the midpoint of passage occurring 2 days later than the average date of July 29. On average, 90% of the run is passed the BTF site by July 11 (Appendix C3). Daily indices were generally below the 10-year averages (Figure 6; Appendix C1).

Chum Salmon

The first chum salmon in 2014 was caught in BTF on June 1. The peak daily CPUE index of 500 occurred on July 3 and the cumulative CPUE index through August 24 was 6,345. Based on the cumulative CPUE index, the central 50% of the chum salmon run passed the BTF site between June 27 and July 10, and the midpoint of passage occurred on July 2 (Table 1). Daily indices tracked with the recent 10-year averages up to June 3, after which they were below average for the remainder of the season (Figure 7; Appendix D1). The total cumulative CPUE index was below the 10-year average of 9,330, and the third lowest cumulative CPUE index for the time period of 2004–2013 (Appendix D2). The central 50% of the chum salmon passage range of dates was 3 days earlier than the 10-year average range of dates of June 30 to July 15. The midpoint of passage occurred 4 days earlier than the average date of July 6 (Appendix D3).

Coho Salmon

The first coho salmon in 2014 was caught in BTF on July 6 and catches continued through the last drift session of the season on August 24. The peak daily CPUE index of 384 occurred on August 10 and the cumulative CPUE index on August 24 was 4,697. Based on the cumulative CPUE index the central 50% of the run passed the BTF site between August 3 and August 14, and the midpoint of passage occurred on August 9 (Table 1). Daily indices generally tracked above the recent 10-year averages up to August 9 when indices were above 10-year averages (Figure 8; Appendix E1). The cumulative CPUE index was above the 10-year average of 3,743, and the third highest cumulative index for the time period of 2004–2013 (Appendix E2). The central 50% of the coho salmon passage was 2 days later than the 10-year average range of dates of August 1 to August 12, and the midpoint of passage occurred 3 days later than the 10-year average date of August 6 (Appendix E3).

CLIMATOLOGICAL AND STREAM OBSERVATIONS

Surface water temperature and water clarity measurements were recorded from June 1 through August 24 in 2014 (Appendices F1 and F2). Of the 164 high tides that occurred during the project's operational period, observations and measurements were made for all of those tides. Water temperatures ranged from 9° to 17°C with an average temperature of 14°C, 1 degree warmer than the recent 10-year average. Water temperatures tracked at or above recent 10-year average temperatures throughout the season (Figure 9; Appendix F1). Daily water clarity ranged

from 0.1 to 1.4 m with an average clarity of 0.5 m. Water clarity tracked generally above the recent 10-year averages except for a 17-day period from June 27 to July 13 when clarity was below 10-year averages (Figure 10; Appendix F2).

DISCUSSION

The 2014 Chinook salmon return was characterized by the low to average estimated total run and spawning escapements drainagewide. Sockeye and chum salmon estimated total runs were average to slightly below average. Coho salmon estimated total run was average to above average. BTF operations were conducted effectively and provided consistent data when compared to Kuskokwim river tributary escapement monitoring projects.

ABUNDANCE INDEX

Chinook Salmon

Inseason assessment of Chinook salmon for 2014, as indicated by the cumulative CPUE index from the BTF, suggested run abundance to be below average to average when compared to most recent 5-year cumulative CPUE indices and are the 2 lowest since 2008 (Figure 11; Appendix B2).

Because of early season subsistence fishing closures, BTF was not a good indicator of run timing and provided limited indication of abundance when compared to observations at escapement projects. The strength of the BTF index relies on comparability over years with similar harvest regimes; in years of restriction on subsistence harvest, the evaluation of BTF indices is limited by the amount of comparable historical data.

Sockeye Salmon

Inseason assessment of sockeye salmon, as indicated by the cumulative CPUE indices, suggested run abundance to be average in 2014 when compared to most recent 10-year cumulative BTF indices. The 2014 sockeye salmon cumulative indices tracked within the range of most recent 10-year cumulative indices, most similar to 2007 and 2009, though the cumulative CPUE indices were the third lowest when compared to the most recent 10 years (Figure 12; Appendix C2).

Postseason evaluation of BTF suggests the cumulative index for sockeye salmon, when compared to most recent 10-year cumulative indices, worked well as an inseason indicator of relative abundance.

Chum Salmon

Inseason assessment of chum salmon relative abundance during the 2014 season, as indicated by the BTF cumulative index, suggested run abundance to be average progressing to below average when compared to most recent 10-year cumulative indices. The subsistence harvest of chum salmon may have been larger because of conservative management actions to protect Chinook salmon. However, 2014 subsistence harvest data are not yet available. Throughout the 2014 season the chum salmon cumulative index tracked similarly with the 2013 return (Figure 13; Appendix D2).

Postseason evaluation of the BTF project suggests the cumulative index for chum salmon worked well as an inseason indicator of abundance. The 2014 chum salmon passage at

escapement monitoring projects confirmed that the cumulative index for chum salmon provided by BTF worked well as an indicator of relative abundance.

Coho Salmon

Inseason assessment of coho salmon relative abundance for 2014, as indicated by the BTF cumulative indices, suggested average run timing and high abundance when compared to recent 10-year cumulative indices. The cumulative index tracked similar to 2009, the final cumulative index was the highest observed since 2009 (Figure 14; Appendix E2).

Postseason evaluation of the Bethel test fishery project suggests the cumulative index for coho salmon worked well as an inseason indicator of abundance. The 2014 coho salmon escapement passage at the Kuskokwim River escapement monitoring projects confirmed that the cumulative index for coho salmon was indicative of an above average abundance and above average escapements drainagewide.

CONCLUSION

Kuskokwim River subsistence and commercial fishery managers have found the BTF project to be successful at providing an index of the relative abundance and migratory timing of salmon runs under typical harvest. Difficulties arise when interpreting BTF CPUE's of species of salmon that are under conservative management and thus changing harvest patterns in the fishery. Dramatic changes in exploitation rates from previous years limit the comparability and overall reliability of the BTF indices for that particular species. Fishery managers require timely inseason assessment of salmon run abundance. Because of the distance between areas of harvest and escapement project locations throughout the Kuskokwim drainage, escapement projects provided limited usefulness early in the salmon runs. As runs progress, a relationship may be seen between inseason CPUE information and escapement project information. In the absence of June commercial catch statistics, the early season indicators are limited to test fisheries and reports (both formal and informal) from subsistence fishermen.

Recommendations regarding the interpretation of inter-annual comparison of BTF information in future reports are as follows:

- Continue the development of a relationship between BTF CPUE indices and escapement at weir projects to use as an inseason assessment tool for managing the Kuskokwim River Chinook salmon fishery and annually evaluate this relationship through regression analysis.
- Consider gillnet selectivity as certain age classes may be under or over represented in the BTF catch. Annual variation in age, sex, and length composition within and between years may affect the comparability of cumulative CPUE values. Maintain the inseason subsistence harvest monitoring program to utilize as a comparison of run timing and run strength with that described by the BTF project.
- Consider the effects of major shifts in subsistence harvest because of fishing restriction and how the interpretation of BTF indices will be affected.

As one of the salmon stock assessment programs for the Kuskokwim River, the BTF has evolved into the primary inseason salmon management tool. Consistency in methods, completeness of a historical database, frequency of operation, and timeliness of results contribute to the success of this program. BTF by itself is an imperfect tool. It requires a measure of subjectivity by

experienced staff to interpret the information effectively. When used in conjunction with other inseason assessment tools, the test fishery can provide managers with insight into salmon run abundance and migratory timing on the Kuskokwim River.

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TABLES AND FIGURES

Table 1.–Catch, daily mean tidal catch per unit effort (CPUE), cumulative mean tidal CPUE, and percent passage for the Bethel test fishery, 2014.

	Chinook				Sockeye				Coho				Chum			
Date	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage
6/1	3	4	4	1	0	0	0	0	0	0	0	0	1	3	3	0
6/2	8	11	15	2	0	0	0	0	0	0	0	0	2	5	8	0
6/3	19	25	39	6	0	0	0	0	0	0	0	0	0	0	8	0
6/4	17	23	63	10	0	0	0	0	0	0	0	0	2	3	11	0
6/5	17	23	85	13	0	0	0	0	0	0	0	0	2	3	14	0
6/6	5	7	92	14	0	0	0	0	0	0	0	0	0	0	14	0
6/7	14	18	110	17	0	0	0	0	0	0	0	0	4	7	21	0
6/8	17	23	133	20	0	0	0	0	0	0	0	0	3	5	26	0
6/9	22	28	162	25	0	0	0	0	0	0	0	0	5	13	39	1
6/10	27	34	195	30	4	10	10	1	0	0	0	0	8	21	60	1
6/11	23	30	226	35	4	10	21	2	0	0	0	0	6	16	76	1
6/12	20	26	252	39	6	16	36	3	0	0	0	0	11	29	105	2
6/13	31	37	289	44	3	5	42	3	0	0	0	0	8	20	125	2
6/14	19	24	313	48	15	36	78	6	0	0	0	0	17	44	169	3
6/15	21	25	338	52	10	19	97	7	0	0	0	0	32	67	236	4
6/16	6	8	346	53	4	11	108	8	0	0	0	0	8	19	255	4
6/17	14	19	365	56	3	8	115	8	0	0	0	0	25	61	316	5
6/18	16	21	385	59	5	10	126	9	0	0	0	0	20	49	365	6
6/19	30	36	421	65	8	16	142	10	0	0	0	0	75	166	532	8
6/20	18	24	445	69	19	46	188	14	0	0	0	0	62	154	686	11
6/21	10	13	458	71	3	5	193	14	0	0	0	0	19	45	731	12
6/22	19	22	481	74	19	46	239	17	0	0	0	0	62	155	886	14
6/23	14	19	500	77	9	23	262	19	0	0	0	0	42	108	994	16
6/24	10	13	513	79	4	9	271	20	0	0	0	0	59	126	1,120	18
6/25	8	11	524	81	7	15	286	21	0	0	0	0	30	74	1,194	19
6/26	11	15	539	83	7	17	303	22	0	0	0	0	106	240	1,434	23
6/27	8	11	550	85	17	34	338	25	0	0	0	0	95	174	1,608	25
6/28	14	18	568	87	47	115	452	33	0	0	0	0	89	242	1,851	29
6/29	4	5	573	88	18	46	498	36	0	0	0	0	115	304	2,155	34
6/30	4	5	579	89	39	87	585	43	0	0	0	0	183	441	2,596	41

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Table 1.–Page 2 of 3.

	Chinook				Sockeye				Coho				Chum			
Date	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage
7/1	6	10	588	91	36	112	697	51	0	0	0	0	74	240	2,836	45
7/2	9	12	600	92	32	103	800	59	0	0	0	0	101	308	3,144	50
7/3	7	11	611	94	48	153	954	70	0	0	0	0	137	500	3,644	57
7/4	5	7	618	95	20	87	1,041	76	0	0	0	0	14	64	3,707	58
7/5	3	5	624	96	20	88	1,129	83	0	0	0	0	104	284	3,992	63
7/6	3	4	628	97	8	30	1,160	85	1	7	7	0	69	316	4,307	68
7/7	1	1	629	97	9	22	1,181	86	0	0	7	0	11	26	4,333	68
7/8	0	0	629	97	13	39	1,220	89	0	0	7	0	51	130	4,463	70
7/9	1	1	630	97	11	30	1,250	91	0	0	7	0	26	67	4,530	71
7/10	0	0	630	97	7	14	1,264	92	1	2	9	0	101	235	4,765	75
7/11	2	3	633	97	6	16	1,280	94	0	0	9	0	53	145	4,910	77
7/12	2	3	636	98	2	2	1,282	94	1	3	12	0	102	243	5,153	81
7/13	1	1	637	98	4	12	1,294	95	1	0	12	0	87	254	5,407	85
7/14	1	1	639	98	0	0	1,294	95	1	3	14	0	30	78	5,484	86
7/15 [a]	2	3	641	99	4	10	1,304	95	1	2	17	0	40	96	5,581	88
7/16	1	2	643	99	2	4	1,308	96	9	16	33	1	36	63	5,644	89
7/17	1	2	645	99	4	7	1,315	96	7	12	45	1	38	60	5,704	90
7/18	0	0	645	99	2	4	1,319	96	7	12	57	1	31	52	5,756	91
7/19	1	2	646	99	2	4	1,323	97	8	14	70	1	24	39	5,796	91
7/20	1	2	648	100	0	0	1,323	97	7	13	83	2	5	9	5,804	91
7/21	0	0	648	100	0	0	1,323	97	4	7	90	2	16	27	5,832	92
7/22	0	0	648	100	3	5	1,328	97	7	13	102	2	22	39	5,871	93
7/23	0	0	648	100	3	6	1,334	98	30	51	154	3	39	66	5,937	94
7/24	0	0	648	100	0	0	1,334	98	22	39	192	4	32	56	5,992	94
7/25	0	0	648	100	1	2	1,335	98	35	60	252	5	28	48	6,040	95
7/26	0	0	648	100	3	5	1,341	98	43	71	324	7	22	37	6,078	96
7/27	0	0	648	100	4	6	1,347	99	80	122	446	9	21	33	6,111	96
7/28	0	0	648	100	0	0	1,347	99	39	66	512	11	15	25	6,136	97
7/29	1	2	650	100	4	7	1,354	99	69	107	619	13	28	44	6,180	97
7/30	0	0	650	100	1	2	1,355	99	73	116	736	16	12	19	6,199	98
7/31	0	0	650	100	0	0	1,355	99	98	156	892	19	12	19	6,217	98

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Table 1.–Page 3 of 3.

	Chinook				Sockeye				Coho				Chum			
Date	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage	No. caught	Daily mean tidal CPUE	Cumulative mean tidal CPUE	Percent passage
8/1	0	0	650	100	0	0	1,355	99	46	78	969	21	10	17	6,234	98
8/2	0	0	650	100	3	5	1,360	100	63	103	1,073	23	7	12	6,246	98
8/3	0	0	650	100	0	0	1,360	100	73	118	1,191	25	5	8	6,254	99
8/4	0	0	650	100	1	1	1,362	100	129	200	1,391	30	11	17	6,272	99
8/5	0	0	650	100	0	0	1,362	100	36	58	1,448	31	4	6	6,277	99
8/6	0	0	650	100	0	0	1,362	100	61	104	1,552	33	5	9	6,286	99
8/7	0	0	650	100	0	0	1,362	100	238	338	1,890	40	4	6	6,292	99
8/8	0	0	650	100	0	0	1,362	100	157	253	2,143	46	4	7	6,299	99
8/9	0	0	650	100	0	0	1,362	100	121	195	2,338	50	4	6	6,305	99
8/10	0	0	650	100	1	2	1,363	100	231	384	2,723	58	6	11	6,315	100
8/11	0	0	650	100	0	0	1,363	100	157	250	2,972	63	2	3	6,319	100
8/12	0	0	650	100	0	0	1,363	100	84	143	3,115	66	3	5	6,324	100
8/13	0	0	650	100	0	0	1,363	100	149	242	3,357	71	2	3	6,327	100
8/14	0	0	650	100	1	2	1,365	100	79	137	3,494	74	1	2	6,329	100
8/15	0	0	650	100	0	0	1,365	100	94	153	3,648	78	2	3	6,332	100
8/16	0	0	650	100	0	0	1,365	100	122	205	3,853	82	0	0	6,332	100
8/17	0	0	650	100	0	0	1,365	100	104	173	4,026	86	1	2	6,334	100
8/18	0	0	650	100	0	0	1,365	100	62	96	4,121	88	1	2	6,336	100
8/19	0	0	650	100	1	2	1,367	100	49	86	4,208	90	0	0	6,336	100
8/20	0	0	650	100	0	0	1,367	100	57	96	4,304	92	1	2	6,338	100
8/21	0	0	650	100	0	0	1,367	100	65	109	4,413	94	1	2	6,339	100
8/22	0	0	650	100	0	0	1,367	100	46	82	4,495	96	2	4	6,343	100
8/23	0	0	650	100	0	0	1,367	100	40	74	4,569	97	0	0	6,343	100
8/24	0	0	650	100	0	0	1,367	100	73	128	4,697	100	1	2	6,345	100
Total	497	650			507	1,367			2,880	4,697			2,549	6,345		

Note: The boxes represent the central 50% of the run and the shaded cells represent the median passage date of the run.

[b] The use of the 8.0 inch mesh gillnet was discontinued after July 15.

Figure 1.–Map of Kuskokwim Management Area including commercial fishing Districts W-1, W-2, W-4, and W-5.

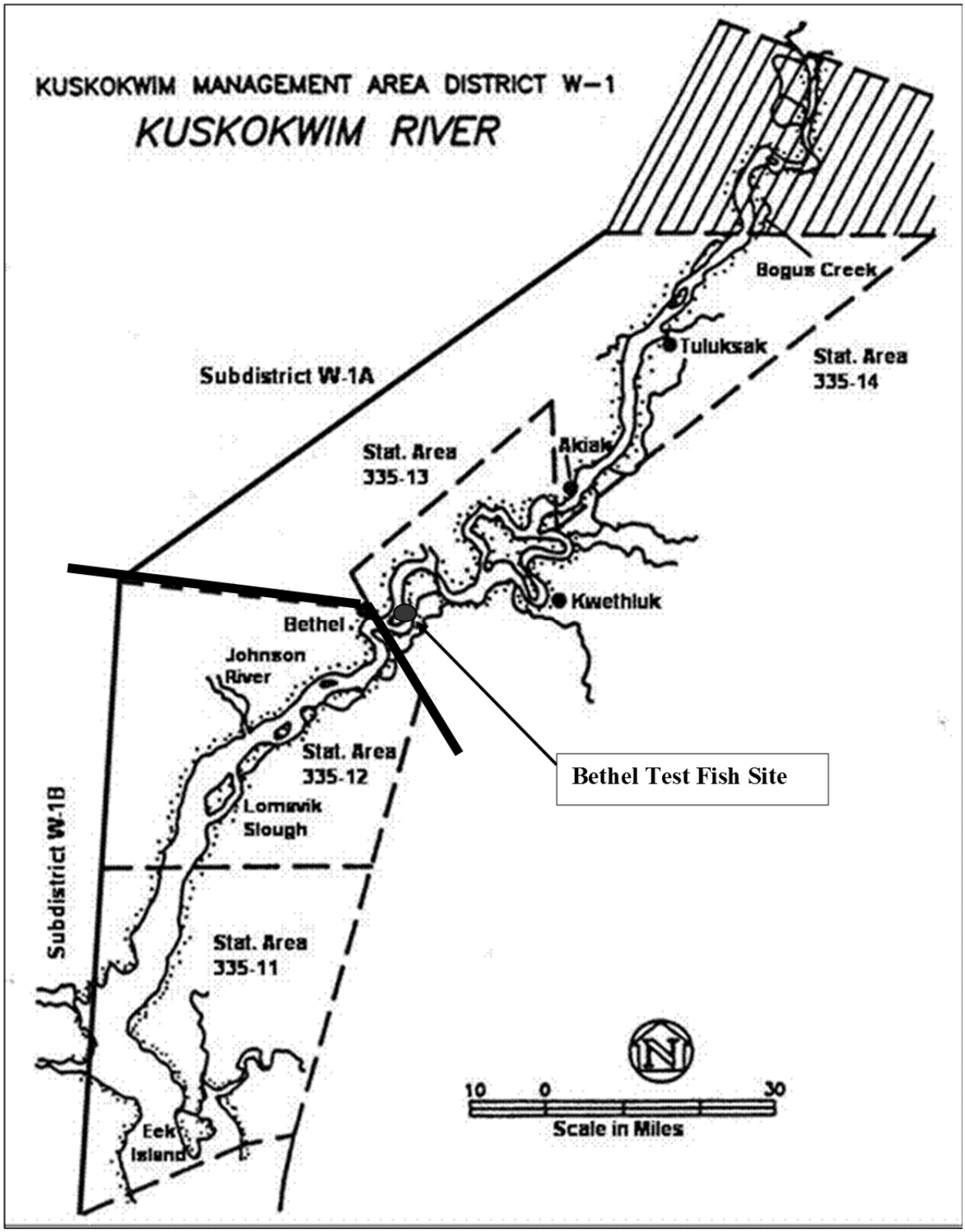

Figure 2.–District 1 (also known as District W-1), the Kuskokwim commercial salmon management area.

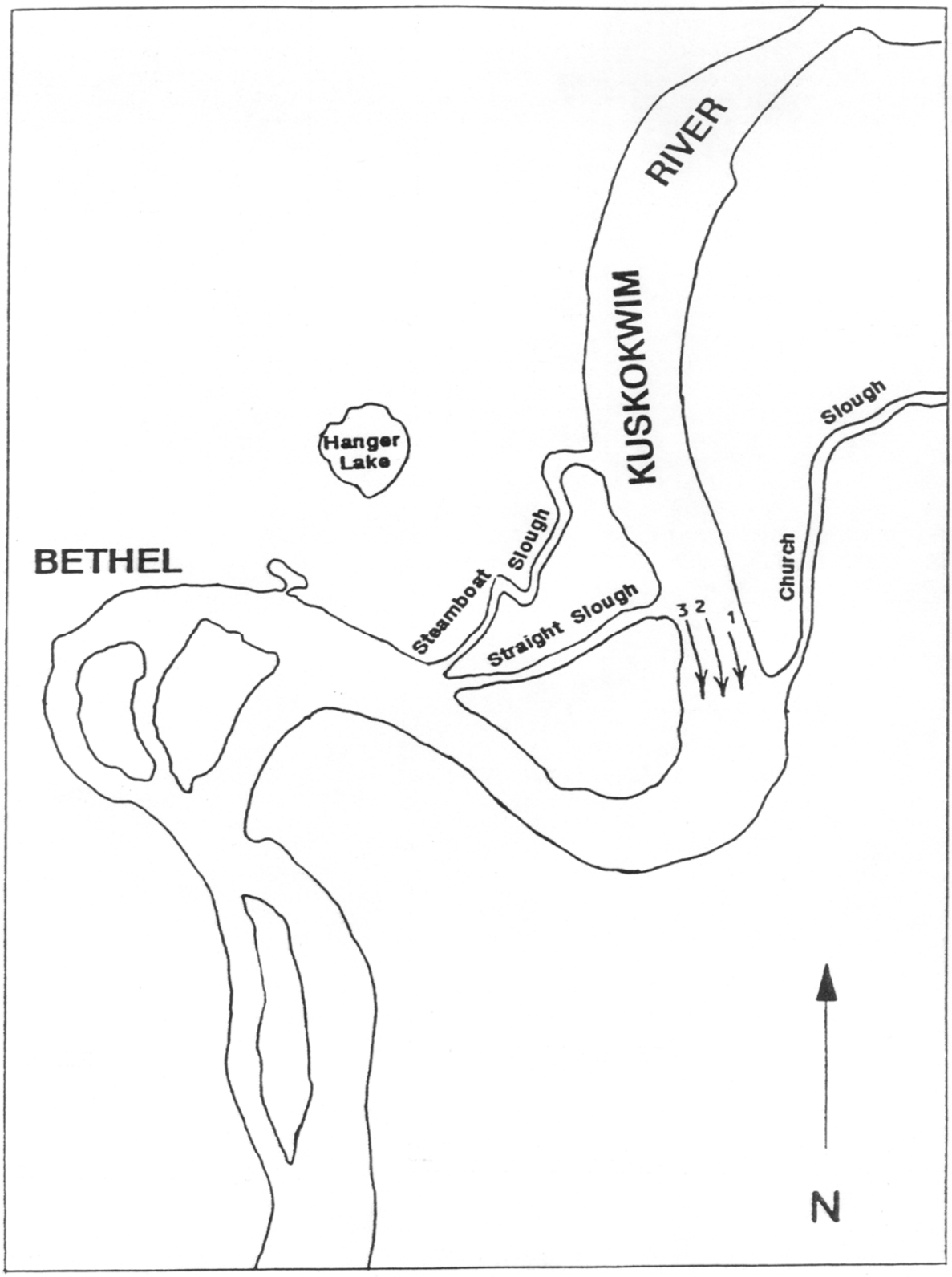

Figure 3.–Bethel test fishery drift Stations 1, 2, and 3.

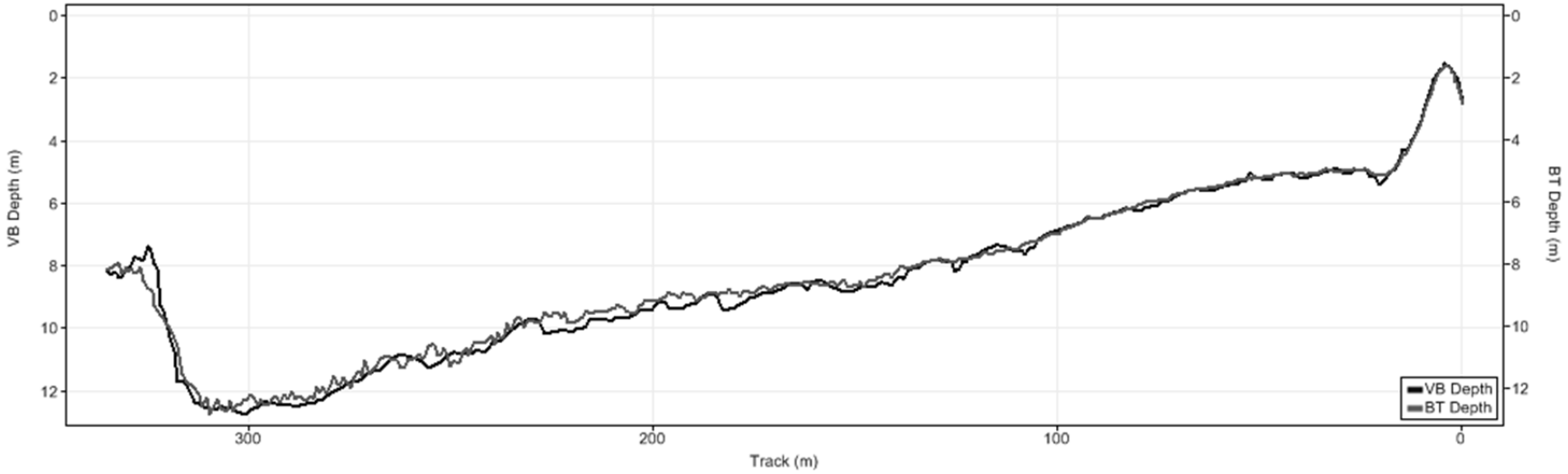

Figure 4.–Typical profile of the Kuskokwim River 4 miles upstream of Bethel, illustrating the area covered by gillnets used in the Bethel test fishery.

Note: Bottom profile depicted was measured in 2013; recorded from the east bank to the west bank by U.S. Fish and Wildlife Service.

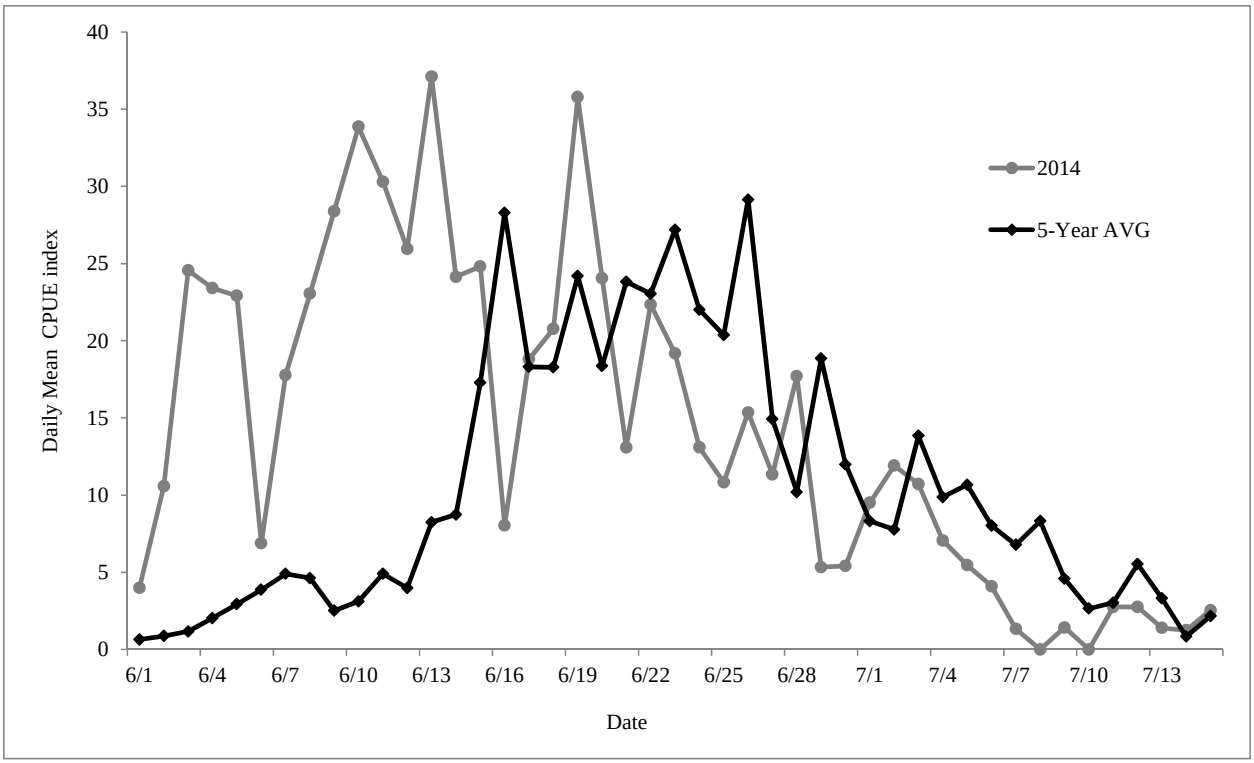

Figure 5.–Chinook salmon daily mean tidal catch per unit effort (CPUE) indices for Bethel test fishery, 2014.

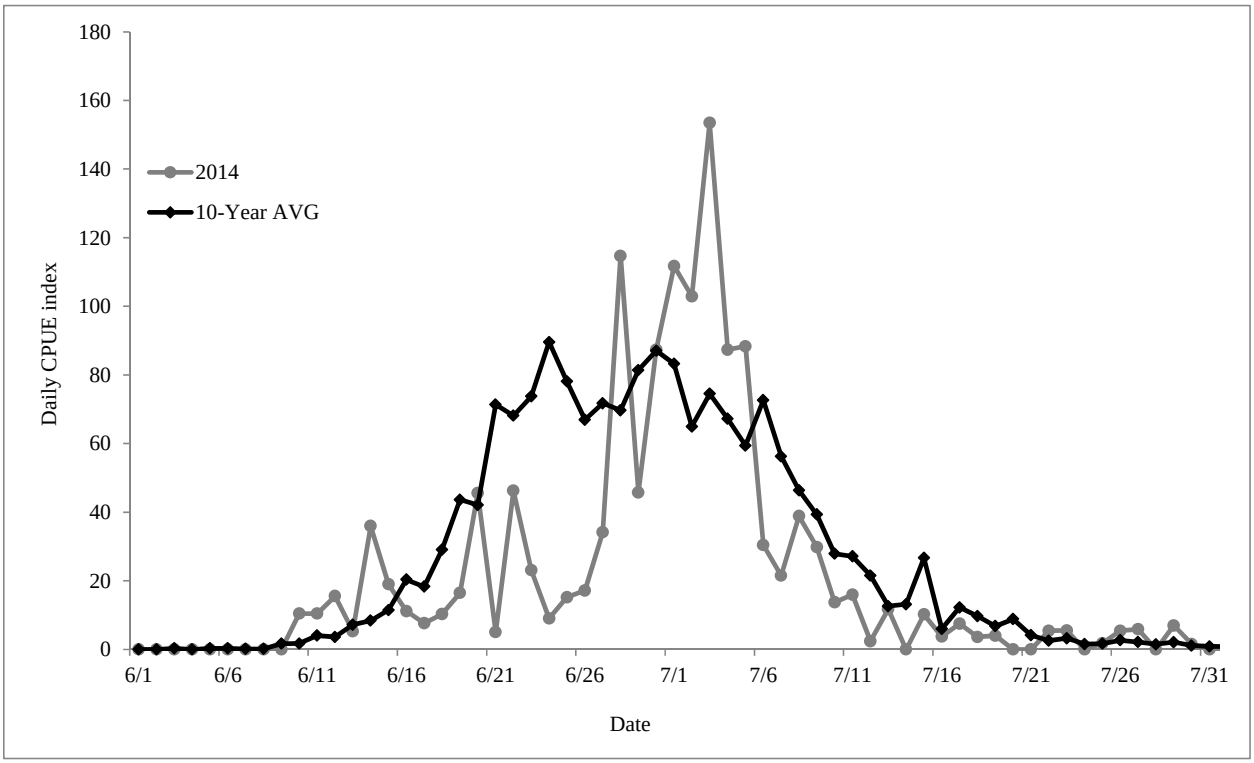

Figure 6.–Sockeye salmon daily mean tidal catch per unit effort (CPUE) indices for Bethel test fishery, 2014.

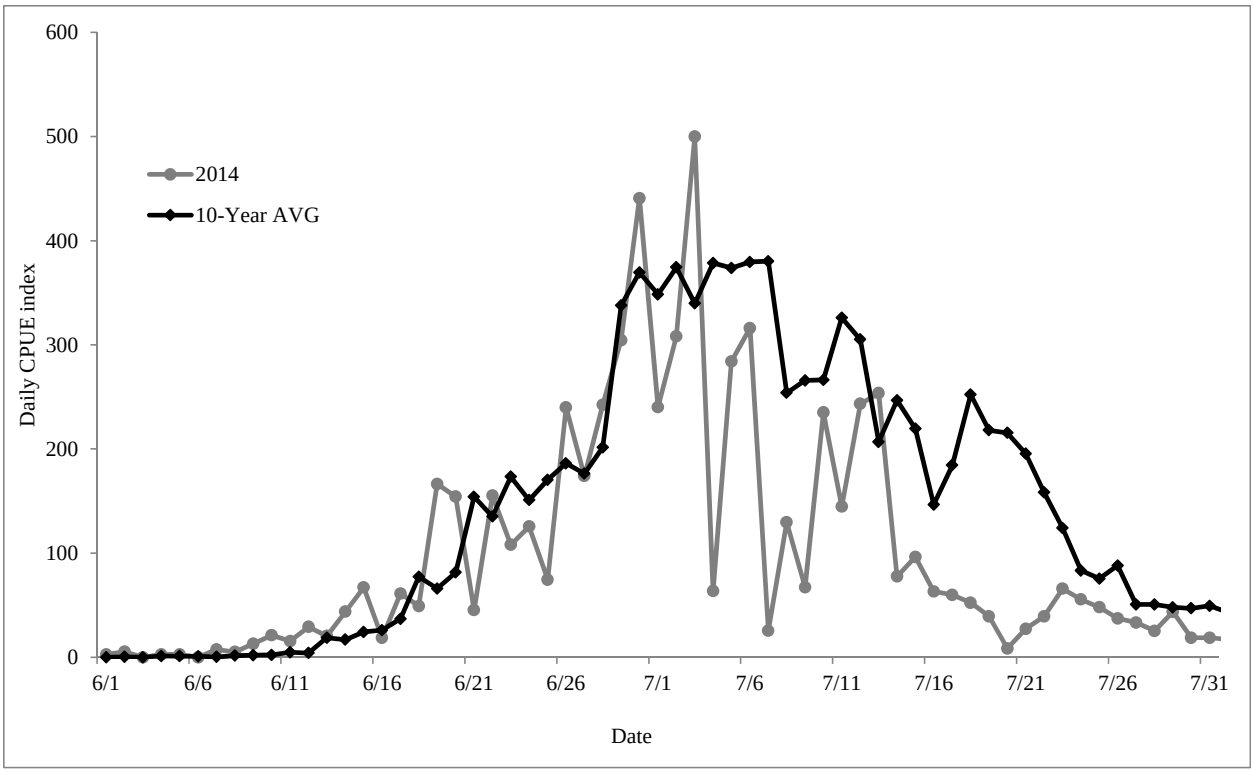

Figure 7.–Chum salmon daily mean tidal catch per unit effort (CPUE) indices for Bethel test fishery, 2014.

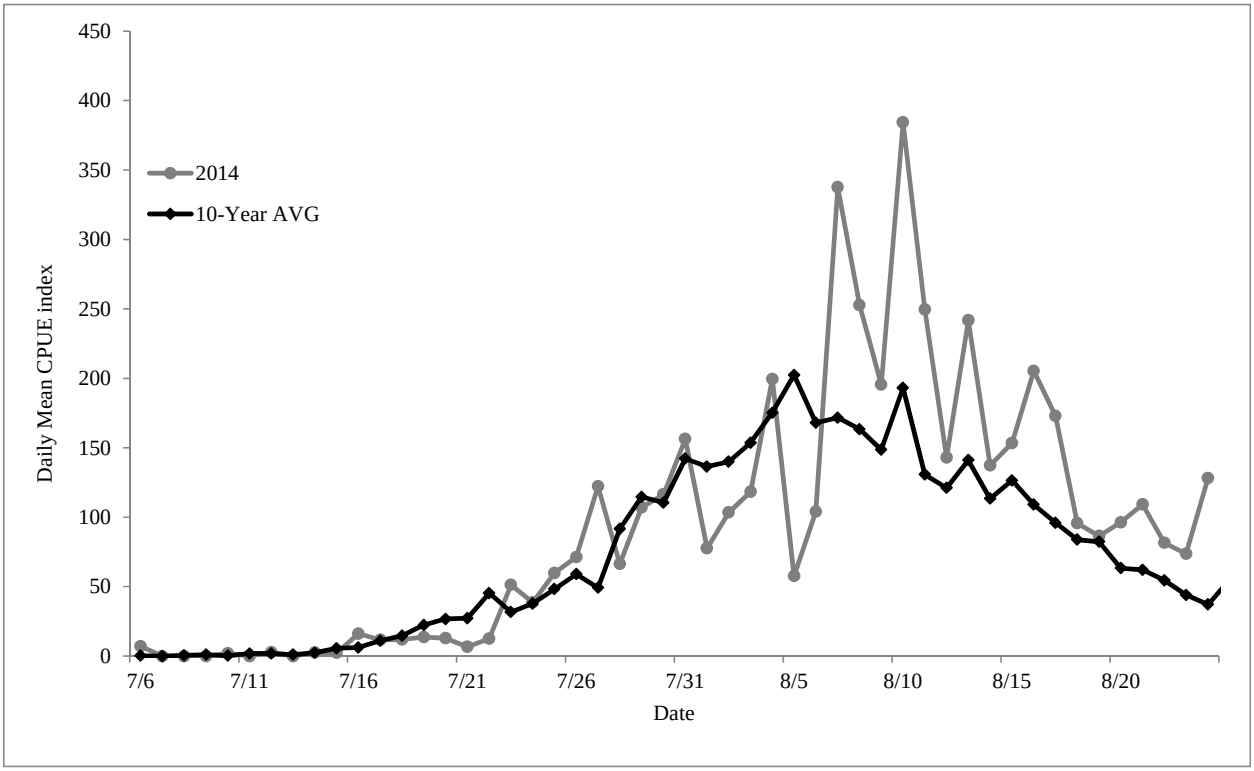

Figure 8.–Coho salmon daily mean tidal catch per unit effort (CPUE) indices for mean Bethel test fishery, 2014.

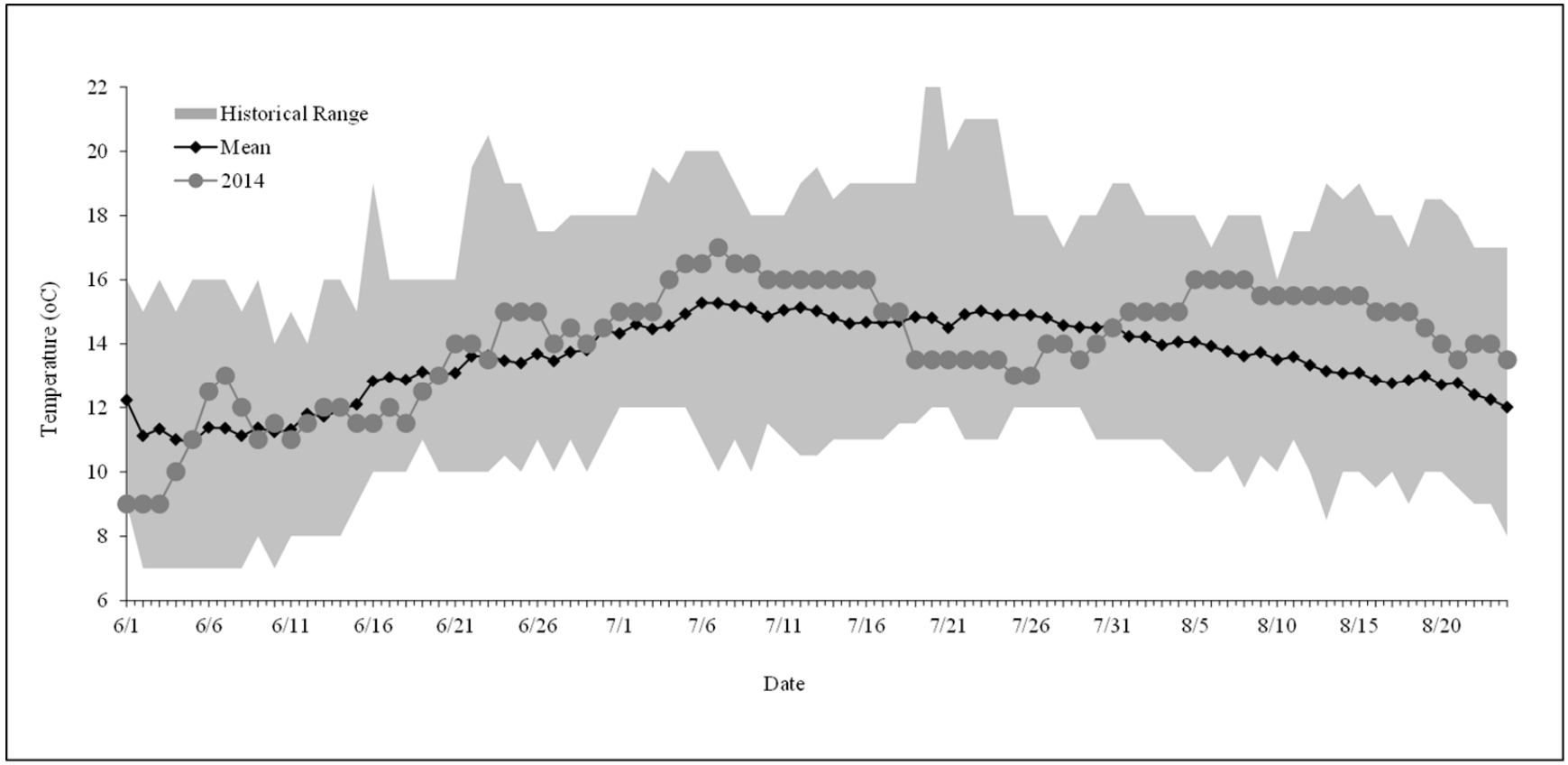

Figure 9.–Historical daily surface water temperature of the Kuskokwim River at the Bethel test fishery site, 2014.

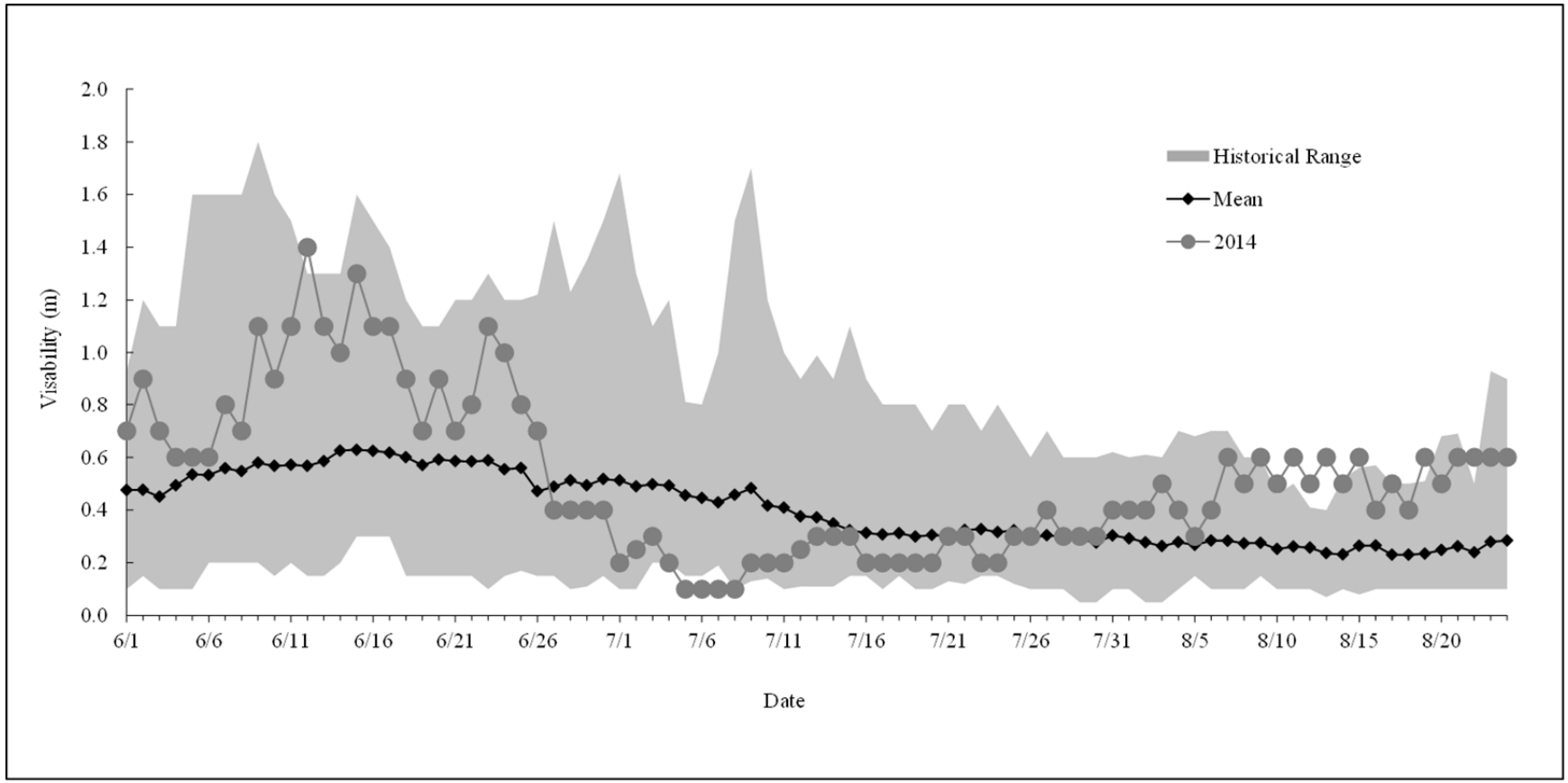

Figure 10.–Historical daily water clarity measurements of the Kuskokwim River at the Bethel test fishery site, 2014.

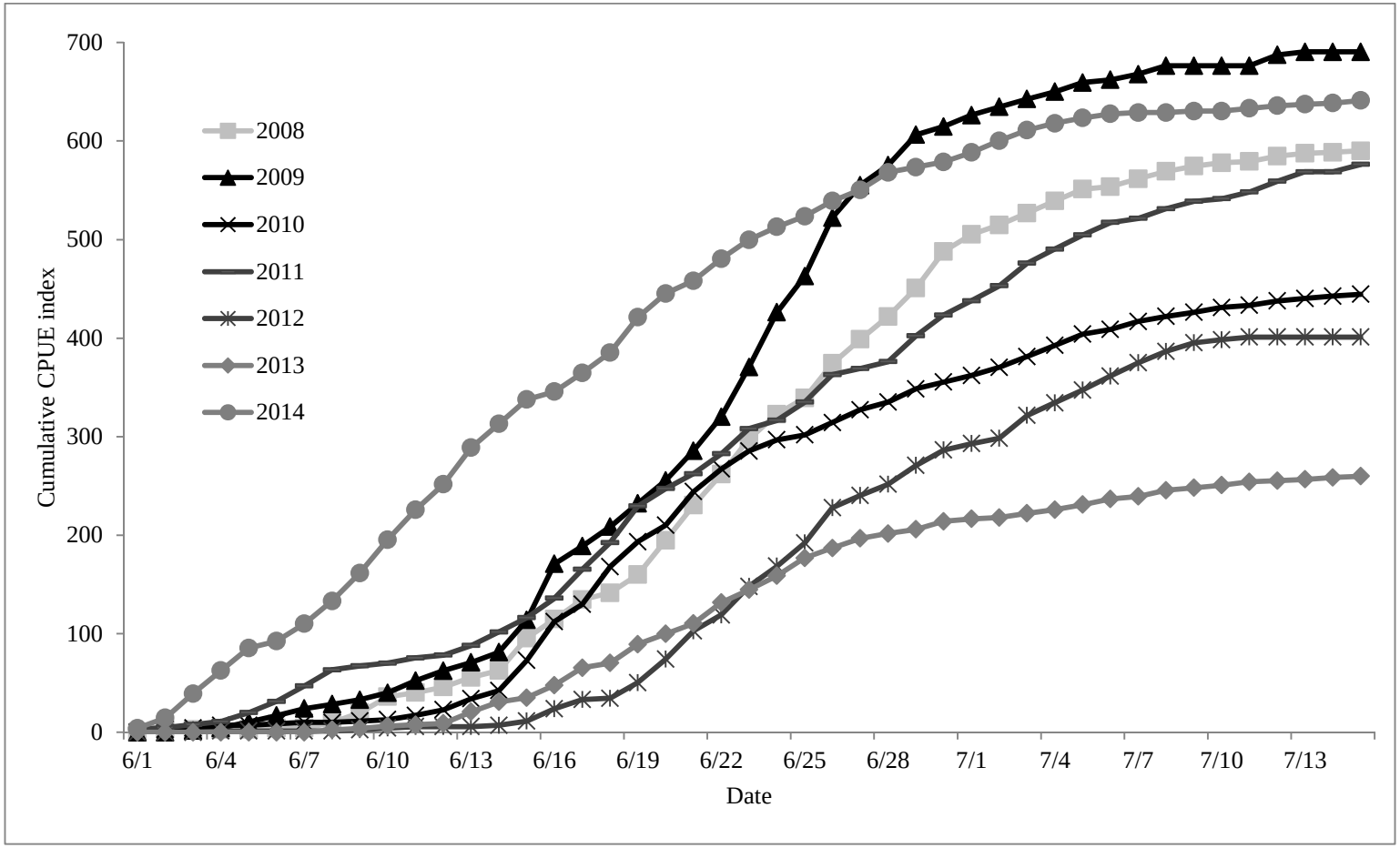

Figure 11.–Chinook salmon cumulative mean tidal CPUE indices for years 2008–2014, Bethel test fishery.

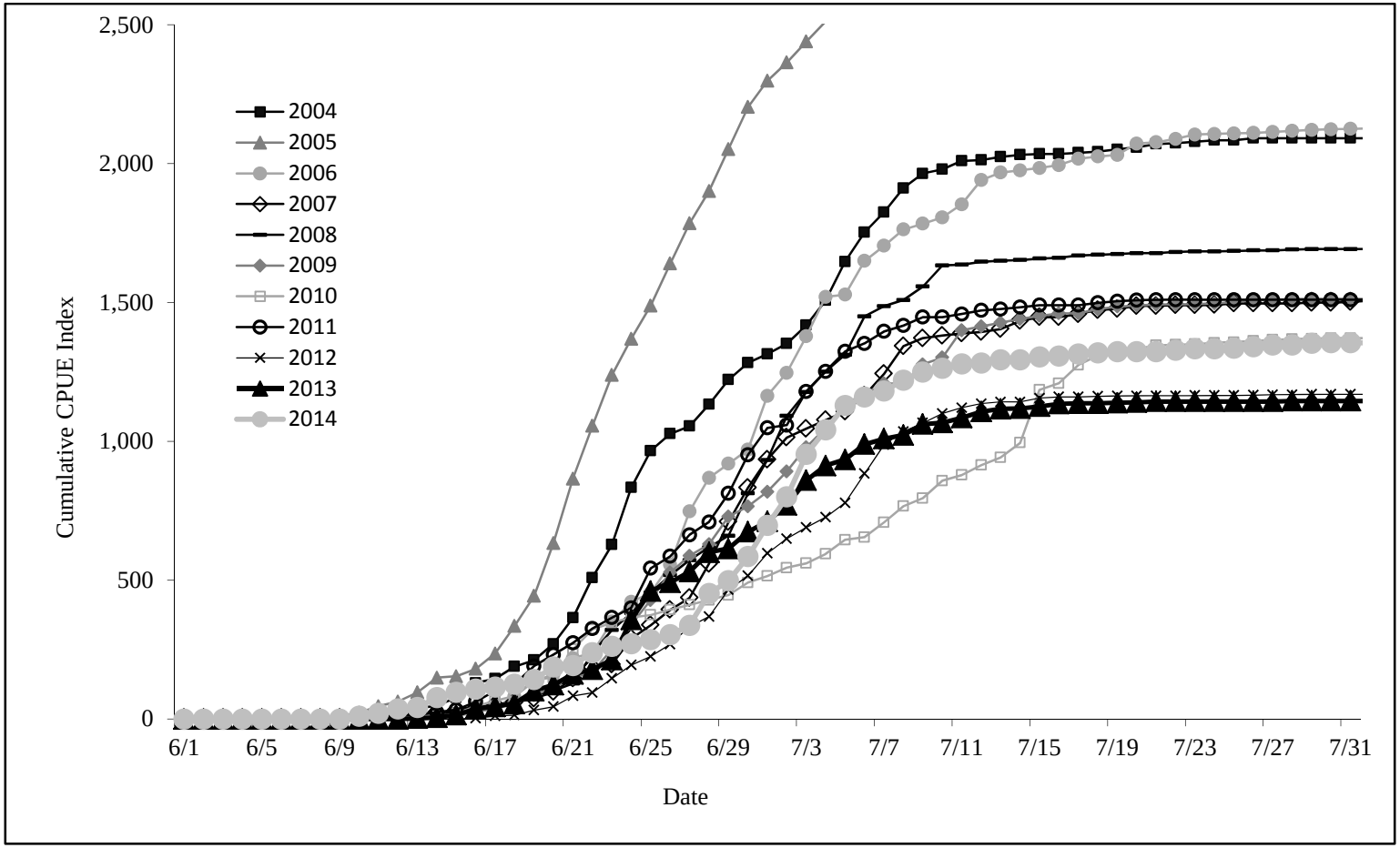

Figure 12.–Sockeye salmon cumulative mean tidal CPUE indices for years 2004–2014, Bethel test fishery.

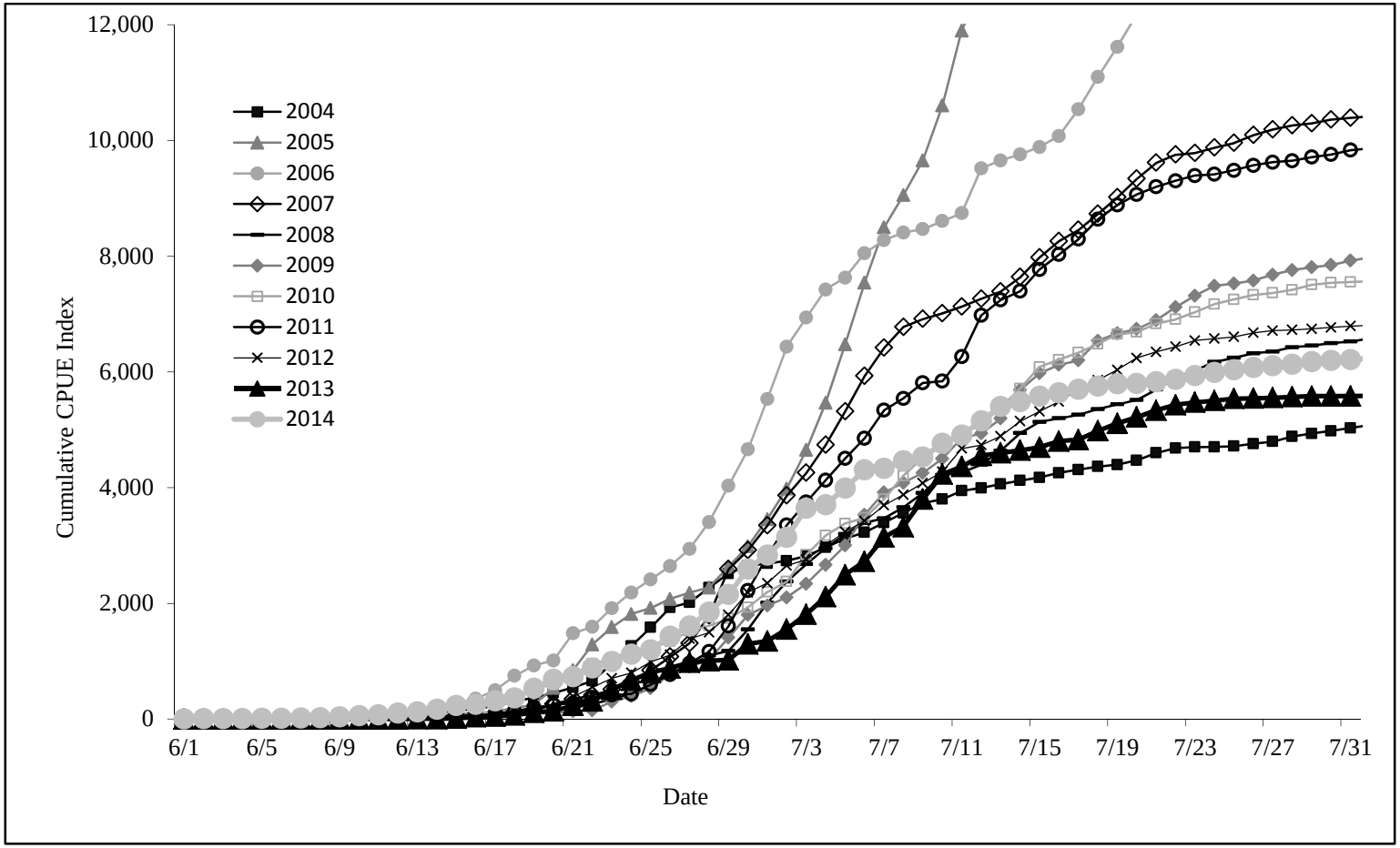

Figure 13.–Chum salmon cumulative mean tidal CPUE indices for years 2004–2014, Bethel test fishery.

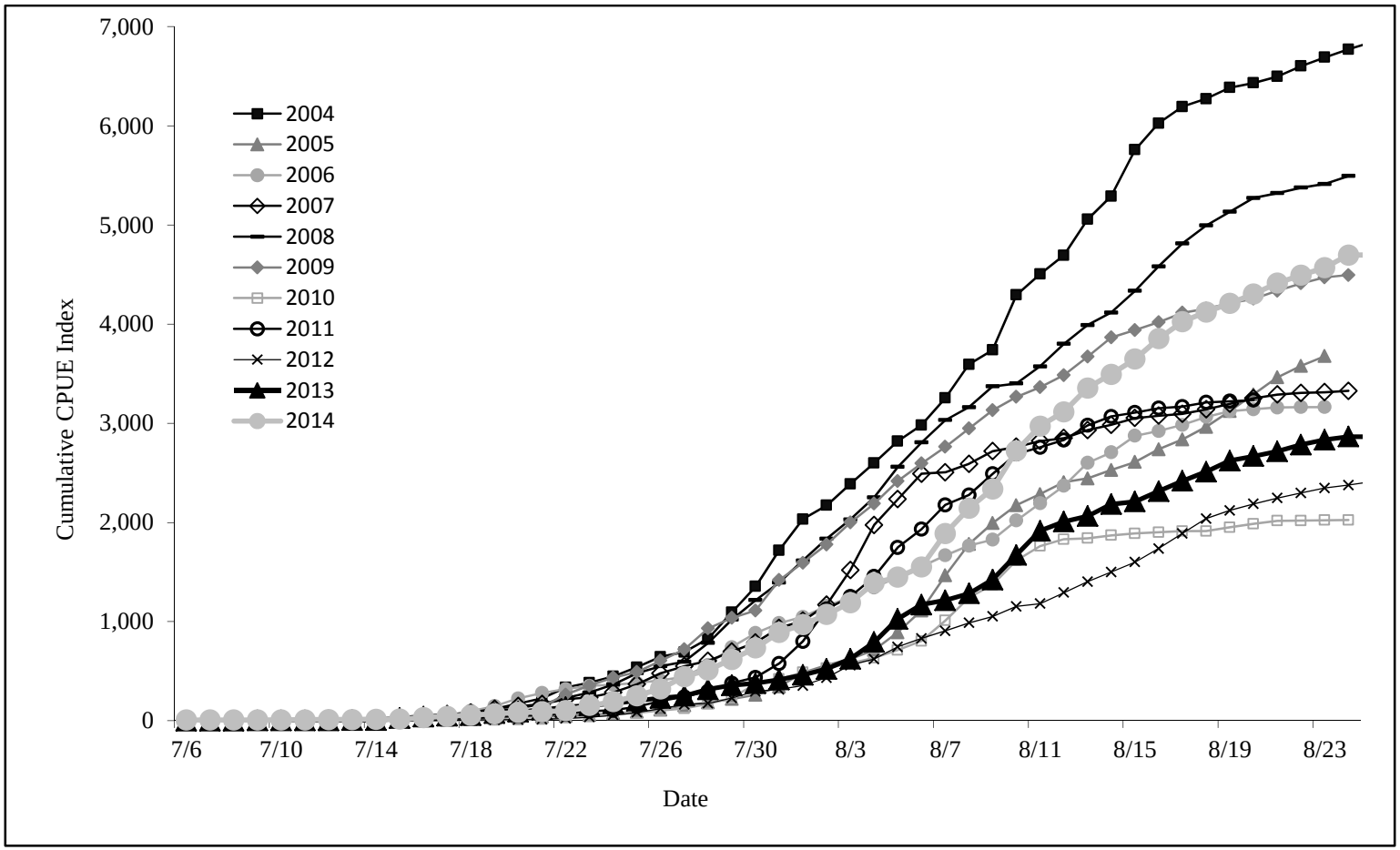

Figure 14.–Coho salmon cumulative mean tidal CPUE indices for years 2004–2014, Bethel test fishery.

APPENDIX A. BETHEL TEST FISHERY DRIFT SCHEDULE

Appendix A1.–Drift schedule used to determine the sequence of mesh sizes to be fished during each tidal drift series of the Bethel test fishery, 2012 and 2013.

1 June to 15 July

Drift schedule		Station number		
A	Tide	1	2	3
	1	8.0 (1)		8.0 (2)
			5 3/8 (3)	5 3/8 (4)
		4 5/8 (5)	4 5/8 (6)	
	2	8.0 (1)	8.0 (2)	
		5 3/8 (4)		5 3/8 (3)
			4 5/8 (5)	4 5/8 (6)
	3		8.0 (1)	8.0 (2)
		5 3/8 (3)	5 3/8 (4)	
		4 5/8 (6)		4 5/8 (5)
	4	8.0 (1)	8.0 (2)	
			5 3/8 (4)	5 3/8 (3)
		4 5/8 (5)		4 5/8 (6)
	5		8.0 (1)	8.0 (2)
		5 3/8 (3)		5 3/8 (4)
		4 5/8 (6)	4 5/8 (5)	
	6	8.0 (1)		8.0 (2)
		5 3/8 (4)	5 3/8 (3)	
			4 5/8 (6)	4 5/8 (5)

July 16 to July 25

Drift schedule		Station number		
B	Tide	1	2	3
	1	5 3/8 (1)	5 3/8 (2)	5 3/8 (3)
		4 5/8 (4)	4 5/8 (5)	4 5/8 (6)
	2	5 3/8 (3)	5 3/8 (1)	5 3/8 (2)
		4 5/8 (6)	4 5/8 (4)	4 5/8 (5)
	3	5 3/8 (2)	5 3/8 (3)	5 3/8 (1)
		4 5/8 (5)	4 5/8 (6)	4 5/8 (4)
	4	5 3/8 (1)	5 3/8 (3)	5 3/8 (2)
		4 5/8 (4)	4 5/8 (6)	4 5/8 (5)
	5	5 3/8 (2)	5 3/8 (1)	5 3/8 (3)
		4 5/8 (5)	4 5/8 (4)	4 5/8 (6)
	6	5 3/8 (3)	5 3/8 (2)	5 3/8 (1)
		4 5/8 (6)	4 5/8 (5)	4 5/8 (4)

July 16 to August 26

Drift schedule		Station number		
C	Tide	1	2	3
	1	5 3/8 (1)	5 3/8 (2)	5 3/8 (3)
	2	5 3/8 (3)	5 3/8 (1)	5 3/8 (2)
	3	5 3/8 (2)	5 3/8 (3)	5 3/8 (1)
	4	5 3/8 (1)	5 3/8 (3)	5 3/8 (2)
	5	5 3/8 (2)	5 3/8 (1)	5 3/8 (3)
	6	5 3/8 (3)	5 3/8 (2)	5 3/8 (1)

APPENDIX B: HISTORICAL CHINOOK SALMON DATA

Appendix B1.–Historical daily mean tidal catch per unit effort for Chinook salmon catches in the Bethel test fishery, 2009–2014.

Date	2009	2010	2011	2012	2013	2014	5-year average
6/1	0	0	3	0		4	1
6/2	0	3	2	0	0	11	1
6/3	1	1	3	0	0	25	1
6/4	3	3	3	1	0	23	2
6/5	6	0	9	0	0	23	3
6/6	7	1	11	0	0	7	4
6/7	7	1	16	0	0	18	5
6/8	4	0	16	0	2	23	5
6/9	5	1	4	1	1	28	3
6/10	7	1	3	2	3	34	3
6/11	12	4	5	1	1	30	5
6/12	10	6	3	0	1	26	4
6/13	8	11	10	0	12	37	8
6/14	10	8	14	1	10	24	9
6/15	33	31	15	4	4	25	17
6/16	57	39	20	13	13	8	28
6/17	18	18	29	9	18	19	18
6/18	20	38	27	1	5	21	18
6/19	24	25	37	16	19	36	24
6/20	23	17	18	24	10	24	18
6/21	30	34	15	29	11	13	24
6/22	35	23	20	16	21	22	23
6/23	50	18	26	29	13	19	27
6/24	56	11	8	21	14	13	22
6/25	37	5	18	24	18	11	20
6/26	59	12	28	36	10	15	29
6/27	33	13	6	12	10	11	15
6/28	20	8	7	11	5	18	10
6/29	31	13	26	19	4	5	19
6/30	8	7	21	16	8	5	12
7/1	12	7	14	7	3	10	8
7/2	8	8	15	5	1	12	8
7/3	8	11	23	23	4	11	14
7/4	7	11	14	13	4	7	10
7/5	9	12	14	13	5	5	11
7/6	3	5	13	14	6	4	8
7/7	6	8	4	13	3	1	7
7/8	9	5	10	12	6	0	8
7/9	0	4	8	9	3	1	5
7/10	0	5	3	3	3	0	3
7/11	0	2	7	3	3	3	3
7/12	11	4	11	0	1	3	6
7/13	3	3	10	0	1	1	3
7/14	0	2	0	0	2	1	1
7/15	0	2	8	0	1	3	2

Note: Date with no data indicates day when the project was not operational.

Appendix B2.–Historical cumulative mean tidal catch per unit effort for Chinook salmon catches in the Bethel test fishery, 2008–2014.

Date	2008	2009	2010	2011	2012	2013	2014	5-year average
6/1	0	0	0	3		0	4	1
6/2	3	0	3	5	0	0	15	2
6/3	3	1	4	8	0	0	39	3
6/4	3	4	7	11	1	0	63	5
6/5	3	10	7	20	1	0	85	8
6/6	4	17	8	31	1	0	92	12
6/7	4	24	10	47	1	0	110	16
6/8	10	28	10	63	1	2	133	21
6/9	20	33	11	67	3	4	162	24
6/10	36	40	13	70	4	6	195	27
6/11	40	52	17	75	6	8	226	32
6/12	46	62	23	78	6	9	252	36
6/13	56	71	34	88	6	21	289	44
6/14	63	81	42	102	7	31	313	53
6/15	96	114	73	116	11	35	338	70
6/16	115	171	112	136	24	48	346	98
6/17	135	189	130	165	33	65	365	116
6/18	142	209	168	192	34	70	385	135
6/19	160	232	193	229	50	89	421	159
6/20	195	255	210	247	74	100	445	177
6/21	230	286	244	262	103	110	458	201
6/22	262	320	267	283	119	132	481	224
6/23	298	371	285	308	148	145	500	251
6/24	323	426	297	317	168	159	513	273
6/25	339	463	302	335	192	177	524	294
6/26	374	522	314	363	228	187	539	323
6/27	399	555	327	369	240	197	550	338
6/28	422	575	335	376	252	202	568	348
6/29	451	606	349	402	271	206	573	367
6/30	488	615	355	423	286	214	579	379
7/1	505	626	362	438	293	217	588	387
7/2	515	635	370	453	298	218	600	395
7/3	527	643	381	476	321	222	611	409
7/4	539	650	393	490	334	226	618	419
7/5	551	659	404	505	347	231	624	429
7/6	554	662	409	517	362	237	628	437
7/7	562	668	417	521	375	239	629	444
7/8	569	676	422	531	387	246	629	452
7/9	575	676	426	539	395	248	630	457
7/10	578	676	431	542	398	251	630	460
7/11	579	676	433	548	401	254	633	463
7/12	585	688	438	559	401	255	636	468
7/13	587	691	440	569	401	257	637	472
7/14	589	691	443	569	401	259	639	472
7/15	590	691	445	576	401	260	641	475

Note: Date with no data indicates day when the project was not operational.

Appendix B3.–Historical percent passage of Chinook salmon at the Bethel test fish site, 2008–2014.

Date	2008	2009	2010	2011	2012	2013	2014	5-year average
6/1	0	0	0	1	0	0	1	0
6/2	0	0	1	1	0	0	2	0
6/3	0	0	1	1	0	0	6	0
6/4	0	1	2	2	0	0	10	1
6/5	0	1	2	3	0	0	13	1
6/6	1	2	2	5	0	0	14	2
6/7	1	3	2	8	0	0	17	2
6/8	2	4	2	11	0	1	20	3
6/9	3	5	2	12	1	1	25	4
6/10	6	6	3	12	1	2	30	5
6/11	6	7	4	13	1	3	35	6
6/12	7	9	5	14	1	3	39	7
6/13	9	10	7	15	1	8	44	8
6/14	10	12	9	18	2	12	48	10
6/15	15	16	16	20	3	13	52	14
6/16	18	24	24	24	6	18	53	19
6/17	22	27	28	29	8	25	56	23
6/18	23	30	36	33	8	27	59	26
6/19	26	33	42	40	12	34	65	31
6/20	31	36	46	43	18	38	69	35
6/21	37	40	53	45	25	42	71	40
6/22	42	45	58	49	28	50	74	46
6/23	48	53	62	53	35	55	77	51
6/24	52	60	64	55	40	61	79	55
6/25	54	66	65	58	46	68	81	59
6/26	60	74	68	63	54	72	83	65
6/27	64	79	71	64	57	75	85	68
6/28	68	82	73	65	60	77	87	71
6/29	72	86	76	70	65	79	88	74
6/30	78	87	77	73	68	82	89	78
7/1	81	89	79	76	70	83	91	79
7/2	83	90	80	78	71	83	92	81
7/3	85	91	83	82	77	85	94	84
7/4	87	92	85	85	80	86	95	86
7/5	88	93	88	87	83	88	96	88
7/6	89	94	89	89	86	91	97	90
7/7	90	95	90	90	90	91	97	91
7/8	91	96	92	92	92	94	97	93
7/9	92	96	92	93	94	95	97	94
7/10	93	96	94	94	95	96	97	94
7/11	93	96	94	95	96	97	97	95
7/12	94	97	95	97	96	98	98	96
7/13	94	98	95	98	96	98	98	97
7/14	94	98	96	98	96	99	98	97
7/15	95	98	96	100	96	99	99	97

Note: The boxes represent the central 50% of the run and the shaded cells represent the median passage date of the run.

APPENDIX C: HISTORICAL SOCKEYE SALMON DATA

Appendix C1.–Historical daily mean tidal catch per unit effort for sockeye salmon catches in the Bethel test fishery, 2004–2014.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
6/1	0	0	0	0	0	0	0	0		0	0	0
6/2	0	0	0	0	0	0	0	0	0	0	0	0
6/3	0	3	0	0	0	0	0	0	0	0	0	0
6/4	0	0	0	0	0	0	0	0	0	0	0	0
6/5	0	3	0	0	0	0	0	0	0	0	0	0
6/6	0	0	0	0	0	0	0	3	0	0	0	0
6/7	0	0	0	0	0	0	0	1	0	0	0	0
6/8	0	0	0	0	0	1	0	0	0	0	0	0
6/9	8	5	0	0	0	3	0	0	0	0	0	2
6/10	3	11	0	0	0	0	0	3	0	0	10	2
6/11	11	24	0	0	0	3	0	3	0	0	10	4
6/12	5	17	3	3	0	3	3	3	0	0	16	4
6/13	11	33	0	14	3	3	3	3	0	3	5	7
6/14	11	53	0	5	3	0	0	9	0	3	36	8
6/15	28	5	8	8	29	2	15	9	0	9	19	11
6/16	53	27	13	6	11	15	26	29	3	22	11	20
6/17	15	55	19	14	3	3	19	40	9	8	8	18
6/18	44	100	38	10	14	28	19	24	3	11	10	29
6/19	23	108	56	14	25	24	58	65	17	46	16	44
6/20	58	190	24	24	15	27	7	41	13	22	46	42
6/21	94	232	58	49	26	33	102	42	38	39	5	71
6/22	145	190	20	39	109	25	72	52	11	17	46	68
6/23	119	183	111	11	84	80	24	39	52	34	23	74
6/24	205	131	72	93	60	89	19	35	48	145	9	90
6/25	133	119	32	48	74	89	8	143	31	103	15	78
6/26	61	151	102	55	63	99	19	43	44	31	17	67
6/27	27	145	192	43	54	60	17	77	63	39	34	72
6/28	79	116	121	123	46	42	17	46	36	70	115	70
6/29	89	151	51	150	42	100	18	103	97	13	46	81
6/30	60	151	51	123	153	37	45	139	51	60	87	87
7/1	32	94	194	101	120	52	24	97	80	38	112	83
7/2	38	66	83	79	159	73	30	10	53	58	103	65
7/3	66	75	132	32	86	87	16	122	40	89	153	75
7/4	89	72	142	31	74	70	33	72	37	53	87	67
7/5	140	70	8	30	61	88	51	72	52	22	88	59
7/6	106	72	122	58	138	33	9	29	105	55	30	73
7/7	72	60	54	79	37	39	53	43	104	20	22	56
7/8	87	58	58	99	22	0	58	21	47	14	39	46
7/9	53	43	21	29	49	69	29	30	31	39	30	39
7/10	15	29	23	10	76	24	63	0	34	5	14	28
7/11	31	15	47	8	3	98	20	11	21	18	16	27
7/12	3	10	87	5	10	14	36	13	15	22	2	22
7/13	12	10	27	11	4	14	28	5	6	10	12	13
7/14	7	10	8	29	2	13	53	7	0	1	0	13

-continued-

Appendix C1.–Page 2 of 2.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
7/15	3	6	8	13	5	11	191	8	14	7	10	27
7/16	0	0	10	0	3	9	24	0	5	9	4	6
7/17	4	8	23	11	8	0	66	0	0	2	7	12
7/18	4	8	8	15	3	16	34	8	2	0	4	10
7/19	8	11	6	3	3	9	19	6	1	2	4	7
7/20	7	11	41	11	3	4	6	3	0	2	0	9
7/21	12	3	5	0	0	3	13	2	0	3	0	4
7/22	3	2	12	3	5	0	2	0	0	0	5	3
7/23	5	4	16	0	2	2	2	0	2	0	6	3
7/24	5	0	2	1	0	2	5	0	0	0	0	2
7/25	0	0	2	5	2	6	2	0	0	0	2	2
7/26	7	4	2	0	2	5	5	0	1	0	5	3
7/27	0	9	4	0	0	3	4	0	2	0	6	2
7/28	0	2	4	0	3	2	2	0	0	2	0	1
7/29	0	9	4	3	2	1	2	0	2	0	7	2
7/30	0	8	2	0	0	0	2	0	0	0	2	1
7/31	0	4	2	3	0	0	0	0	0	0	0	1
8/1	0	2	2	5	0	0	0	0	0	0	0	1
8/2	0	5	6	2	0	0	0	0	0	0	5	1
8/3	5	4	0	2	2	2	0	0	0	0	0	1
8/4	3	3	0	2	2	5	0	4	0	0	1	2
8/5	4	7	2	2	2	0	0	0	1	0	0	2
8/6	0	2	1	2	7	0	0	0	0	0	0	1
8/7	0	5	0	0	0	0	0	0	0	0	0	0
8/8	0	4	0	0	0	0	0	1	0	0	0	0
8/9	0	0	0	0	0	0	2	2	0	0	0	0
8/10	0	2	0	0	0	0	0	0	0	0	2	0
8/11	0	0	0	1	0	0	0	0	0	0	0	0
8/12	0	0	0	2	0	0	0	0	0	0	0	0
8/13	0	0	0	0	0	0	0	0	0	0	0	0
8/14	0	2	0	0	0	0	0	0	0	0	2	0
8/15	0	0	0	0	0	0	0	0	0	0	0	0
8/16	0	0	0	2	0	0	0	0	0	0	0	0
8/17	0	0	0	0	0	0	0	0	0	0	0	0
8/18	0	4	0	0	2	0	0	0	0	0	0	1
8/19	1	0	0	0	0	0	0	0	0	0	2	0
8/20	3	0	0	0	2	0	0	0	0	0	0	0
8/21	0	3	0	0	0	0	0		0	0	0	0
8/22	0	0	0	0	0	0	0		0	0	0	0
8/23	0	0	0	0	0	0	0		0	0	0	0
8/24	0			0	0	0	0		0	0	0	0

Note: Date with no data indicates day when the project was not operational.

Appendix C2.–Historical cumulative mean tidal catch per unit effort for sockeye salmon catches in the Bethel test fishery, 2004–2014.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
6/1	0	0	0	0	0	0	0	0		0	0	0
6/2	0	0	0	0	0	0	0	0	0	0	0	0
6/3	0	3	0	0	0	0	0	0	0	0	0	0
6/4	0	3	0	0	0	0	0	0	0	0	0	0
6/5	0	6	0	0	0	0	0	0	0	0	0	1
6/6	0	6	0	0	0	0	0	3	0	0	0	1
6/7	0	6	0	0	0	0	0	4	0	0	0	1
6/8	0	6	0	0	0	1	0	4	0	0	0	1
6/9	8	11	0	0	0	4	0	4	0	0	0	3
6/10	11	22	0	0	0	4	0	7	0	0	10	5
6/11	22	46	0	0	0	7	0	10	0	0	21	9
6/12	27	63	3	3	0	10	3	13	0	0	36	12
6/13	38	96	3	17	3	13	6	15	0	3	42	19
6/14	49	149	3	23	6	13	6	24	0	6	78	28
6/15	77	154	11	31	34	16	21	33	0	15	97	39
6/16	130	181	24	36	45	31	46	62	3	37	108	60
6/17	145	236	42	50	48	34	65	102	12	45	115	78
6/18	189	336	81	60	62	61	84	126	14	56	126	107
6/19	212	444	136	74	87	86	142	191	32	102	142	150
6/20	270	634	160	98	102	113	149	231	45	123	188	193
6/21	364	866	219	147	128	146	251	274	83	162	193	264
6/22	509	1,056	239	186	237	171	323	326	95	179	239	332
6/23	628	1,239	350	197	320	251	347	365	146	213	262	406
6/24	833	1,370	422	290	381	340	366	400	194	358	271	495
6/25	966	1,489	454	338	455	429	375	543	225	461	286	573
6/26	1,027	1,640	556	393	518	528	394	586	269	492	303	640
6/27	1,055	1,785	748	436	572	588	411	664	333	531	338	712
6/28	1,133	1,901	869	560	619	629	428	709	369	601	452	782
6/29	1,222	2,052	920	710	660	729	446	813	466	614	498	863
6/30	1,283	2,204	971	833	813	766	491	952	516	674	585	950
7/1	1,315	2,298	1,164	934	933	818	515	1,048	597	712	697	1,033
7/2	1,352	2,365	1,247	1,014	1,092	892	545	1,058	650	770	800	1,098
7/3	1,418	2,440	1,379	1,046	1,178	979	561	1,180	690	860	954	1,173
7/4	1,507	2,512	1,520	1,077	1,251	1,048	594	1,252	727	913	1,041	1,240
7/5	1,647	2,583	1,528	1,107	1,312	1,136	645	1,324	778	935	1,129	1,300
7/6	1,753	2,655	1,650	1,165	1,450	1,169	655	1,353	884	990	1,160	1,372
7/7	1,825	2,715	1,704	1,243	1,487	1,209	708	1,396	988	1,009	1,181	1,429
7/8	1,912	2,773	1,763	1,343	1,509	1,209	766	1,417	1,035	1,023	1,220	1,475
7/9	1,965	2,816	1,784	1,371	1,557	1,277	795	1,448	1,066	1,062	1,250	1,514
7/10	1,980	2,845	1,807	1,381	1,634	1,302	858	1,448	1,100	1,067	1,264	1,542
7/11	2,010	2,860	1,854	1,389	1,636	1,400	879	1,459	1,121	1,085	1,280	1,569
7/12	2,013	2,870	1,941	1,394	1,647	1,414	914	1,472	1,136	1,107	1,282	1,591
7/13	2,025	2,880	1,968	1,405	1,650	1,428	942	1,476	1,142	1,117	1,294	1,603
7/14	2,032	2,890	1,976	1,434	1,653	1,441	995	1,483	1,142	1,119	1,294	1,616

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Appendix C2.–Page 2 of 2.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
7/15	2,035	2,896	1,985	1,447	1,658	1,452	1,186	1,491	1,156	1,126	1,304	1,643
7/16	2,035	2,896	1,995	1,447	1,661	1,461	1,209	1,491	1,161	1,135	1,308	1,649
7/17	2,039	2,904	2,018	1,459	1,669	1,461	1,275	1,491	1,161	1,137	1,315	1,661
7/18	2,043	2,912	2,026	1,473	1,672	1,476	1,309	1,499	1,163	1,137	1,319	1,671
7/19	2,052	2,923	2,031	1,477	1,674	1,485	1,328	1,505	1,164	1,139	1,323	1,678
7/20	2,059	2,934	2,073	1,488	1,677	1,489	1,333	1,508	1,164	1,141	1,323	1,687
7/21	2,071	2,937	2,077	1,488	1,677	1,493	1,346	1,510	1,164	1,144	1,323	1,691
7/22	2,074	2,939	2,089	1,490	1,682	1,493	1,348	1,510	1,164	1,144	1,328	1,693
7/23	2,079	2,943	2,105	1,490	1,684	1,495	1,350	1,510	1,166	1,144	1,334	1,697
7/24	2,084	2,943	2,107	1,492	1,684	1,497	1,355	1,510	1,166	1,144	1,334	1,698
7/25	2,084	2,943	2,109	1,497	1,685	1,502	1,357	1,510	1,166	1,144	1,335	1,700
7/26	2,092	2,948	2,111	1,497	1,687	1,507	1,362	1,510	1,167	1,144	1,341	1,702
7/27	2,092	2,956	2,115	1,497	1,687	1,511	1,366	1,510	1,168	1,144	1,347	1,705
7/28	2,092	2,958	2,118	1,497	1,691	1,513	1,368	1,510	1,168	1,146	1,347	1,706
7/29	2,092	2,967	2,122	1,499	1,692	1,514	1,370	1,510	1,170	1,146	1,354	1,708
7/30	2,092	2,974	2,124	1,499	1,692	1,514	1,371	1,510	1,170	1,146	1,355	1,709
7/31	2,092	2,979	2,125	1,502	1,692	1,514	1,371	1,510	1,170	1,146	1,355	1,710
8/1	2,092	2,980	2,127	1,507	1,692	1,514	1,371	1,510	1,170	1,146	1,355	1,711
8/2	2,092	2,986	2,133	1,508	1,692	1,514	1,371	1,510	1,170	1,146	1,360	1,712
8/3	2,097	2,990	2,133	1,510	1,694	1,516	1,371	1,510	1,170	1,146	1,360	1,714
8/4	2,100	2,992	2,133	1,512	1,696	1,521	1,371	1,514	1,170	1,146	1,362	1,715
8/5	2,104	2,999	2,135	1,514	1,697	1,521	1,371	1,514	1,171	1,146	1,362	1,717
8/6	2,104	3,001	2,136	1,515	1,704	1,521	1,371	1,514	1,171	1,146	1,362	1,718
8/7	2,104	3,006	2,136	1,515	1,704	1,521	1,371	1,514	1,171	1,146	1,362	1,719
8/8	2,104	3,009	2,136	1,515	1,704	1,521	1,371	1,515	1,171	1,146	1,362	1,719
8/9	2,104	3,009	2,136	1,515	1,704	1,521	1,374	1,517	1,171	1,146	1,362	1,720
8/10	2,104	3,011	2,136	1,515	1,704	1,521	1,374	1,517	1,171	1,146	1,363	1,720
8/11	2,104	3,011	2,136	1,516	1,704	1,521	1,374	1,517	1,171	1,146	1,363	1,720
8/12	2,104	3,011	2,136	1,518	1,704	1,521	1,374	1,517	1,171	1,146	1,363	1,720
8/13	2,104	3,011	2,136	1,518	1,704	1,521	1,374	1,517	1,171	1,146	1,363	1,720
8/14	2,104	3,013	2,136	1,518	1,704	1,521	1,374	1,517	1,171	1,146	1,365	1,720
8/15	2,104	3,013	2,136	1,518	1,704	1,521	1,374	1,517	1,171	1,146	1,365	1,720
8/16	2,104	3,013	2,136	1,520	1,704	1,521	1,374	1,517	1,171	1,146	1,365	1,720
8/17	2,104	3,013	2,136	1,520	1,704	1,521	1,374	1,517	1,171	1,146	1,365	1,720
8/18	2,104	3,017	2,136	1,520	1,706	1,521	1,374	1,517	1,171	1,146	1,365	1,721
8/19	2,105	3,017	2,136	1,520	1,706	1,521	1,374	1,517	1,171	1,146	1,367	1,721
8/20	2,108	3,017	2,136	1,520	1,708	1,521	1,374	1,517	1,171	1,146	1,367	1,722
8/21	2,108	3,019	2,136	1,520	1,708	1,521	1,374		1,171	1,146	1,367	1,745
8/22	2,108	3,019	2,136	1,520	1,708	1,521	1,374		1,171	1,146	1,367	1,745
8/23	2,108	3,019	2,136	1,520	1,708	1,521	1,374		1,171	1,146	1,367	1,745
8/24	2,108			1,520	1,708	1,521	1,374		1,171	1,146	1,367	1,507

Note: Date with no data indicates day when the project was not operational.

Appendix C3.–Historical percent passage of sockeye salmon at the Bethel test fish site, 2004–2014.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
6/1	0	0	0	0	0	0	0	0	0	0	0	0
6/2	0	0	0	0	0	0	0	0	0	0	0	0
6/3	0	0	0	0	0	0	0	0	0	0	0	0
6/4	0	0	0	0	0	0	0	0	0	0	0	0
6/5	0	0	0	0	0	0	0	0	0	0	0	0
6/6	0	0	0	0	0	0	0	0	0	0	0	0
6/7	0	0	0	0	0	0	0	0	0	0	0	0
6/8	0	0	0	0	0	0	0	0	0	0	0	0
6/9	0	0	0	0	0	0	0	0	0	0	0	0
6/10	1	1	0	0	0	0	0	0	0	0	1	0
6/11	1	2	0	0	0	0	0	1	0	0	2	0
6/12	1	2	0	0	0	1	0	1	0	0	3	1
6/13	2	3	0	1	0	1	0	1	0	0	3	1
6/14	2	5	0	1	0	1	0	2	0	0	6	2
6/15	4	5	1	2	2	1	2	2	0	1	7	2
6/16	6	6	1	2	3	2	3	4	0	3	8	4
6/17	7	8	2	3	3	2	5	7	1	4	8	5
6/18	9	11	4	4	4	4	6	8	1	5	9	6
6/19	10	15	6	5	5	6	10	13	3	9	10	8
6/20	13	21	8	6	6	7	11	15	4	11	14	11
6/21	17	29	10	10	7	10	18	18	7	14	14	14
6/22	24	35	11	12	14	11	23	21	8	16	17	18
6/23	30	41	16	13	19	16	25	24	12	19	19	21
6/24	40	45	20	19	22	22	27	26	17	31	20	26
6/25	46	49	21	22	27	28	27	36	19	40	21	31
6/26	49	54	26	26	30	35	29	39	23	43	22	34
6/27	50	59	35	29	34	39	30	44	28	46	25	38
6/28	54	63	41	37	36	41	31	47	32	52	33	42
6/29	58	68	43	47	39	48	32	54	40	54	36	47
6/30	61	73	45	55	48	50	36	63	44	59	43	52
7/1	62	76	55	61	55	54	38	69	51	62	51	58
7/2	64	78	58	67	64	59	40	70	55	67	59	62
7/3	67	81	65	69	69	64	41	78	59	75	70	67
7/4	72	83	71	71	73	69	43	83	62	80	76	71
7/5	78	86	72	73	77	75	47	87	66	82	83	75
7/6	83	88	77	77	85	77	48	89	75	86	85	79
7/7	87	90	80	82	87	79	52	92	84	88	86	82
7/8	91	92	83	88	88	79	56	93	88	89	89	85
7/9	93	93	84	90	91	84	58	95	91	93	91	88
7/10	94	94	85	91	96	86	62	95	94	93	92	89
7/11	95	95	87	91	96	92	64	96	96	95	94	91
7/12	96	95	91	92	96	93	67	97	97	97	94	92
7/13	96	95	92	92	97	94	69	97	97	98	95	93
7/14	96	96	93	94	97	95	72	98	97	98	95	94
7/15	97	96	93	95	97	95	86	98	99	98	95	95
7/16	97	96	93	95	97	96	88	98	99	99	96	96
7/17	97	96	94	96	98	96	93	98	99	99	96	97
7/18	97	96	95	97	98	97	95	99	99	99	96	97
7/19	97	97	95	97	98	98	97	99	99	99	97	98
7/20	98	97	97	98	98	98	97	99	99	100	97	98

Note: The boxes represent the central 50% of the run and the shaded cells represent the median passage date of the run.

APPENDIX D: HISTORICAL CHUM SALMON DATA

Appendix D1.–Historical daily mean tidal catch per unit effort for chum salmon catches in the Bethel test fishery, 2004–2014.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
6/1	0	0	0	0	0	0	0	0		0	3	0
6/2	3	0	0	0	0	0	0	0	0	0	5	0
6/3	0	0	0	0	0	0	0	0	0	0	0	0
6/4	5	0	0	0	0	0	4	3	0	0	3	1
6/5	3	0	3	0	0	3	3	0	0	0	3	1
6/6	0	0	6	0	0	1	0	0	3	0	0	1
6/7	0	0	0	3	0	0	0	0	0	0	7	0
6/8	3	0	3	0	6	1	0	3	0	0	5	2
6/9	8	0	0	0	3	3	0	6	0	0	13	2
6/10	0	0	3	6	0	0	3	6	5	0	21	2
6/11	3	13	20	3	3	0	0	5	0	0	16	5
6/12	9	12	6	0	6	3	6	0	0	0	29	4
6/13	37	14	92	12	0	3	11	8	8	4	20	19
6/14	39	11	77	11	3	6	6	9	8	0	44	17
6/15	34	38	56	23	21	21	19	21	0	10	67	24
6/16	35	8	84	17	25	28	35	3	3	23	19	26
6/17	50	35	149	19	14	5	47	22	15	11	61	37
6/18	81	57	248	17	14	16	253	50	15	21	49	77
6/19	61	64	179	28	11	8	156	64	42	46	166	66
6/20	79	285	85	119	55	6	46	42	72	24	154	81
6/21	98	307	470	86	29	30	176	35	216	95	45	154
6/22	112	444	113	64	74	14	190	95	166	79	155	135
6/23	300	299	321	99	73	152	95	43	152	197	108	173
6/24	301	229	272	126	100	96	114	19	93	158	126	151
6/25	322	101	223	208	161	135	61	164	191	136	74	170
6/26	343	159	235	234	156	251	115	172	121	77	240	186
6/27	88	106	294	234	168	121	184	194	276	98	174	176
6/28	257	91	462	475	179	125	89	202	109	28	242	202
6/29	242	358	629	806	77	379	126	441	306	13	304	338
6/30	139	358	629	328	373	393	193	616	387	277	441	369
7/1	36	466	870	424	461	159	265	590	162	52	240	348
7/2	47	527	907	520	367	145	182	541	303	204	308	374
7/3	83	667	500	391	302	236	461	397	103	258	500	340
7/4	146	814	487	484	273	324	334	377	242	304	64	379
7/5	156	1013	205	577	244	336	207	377	241	380	284	374
7/6	106	1065	425	613	194	530	99	349	184	230	316	380
7/7	168	955	225	487	81	386	324	486	272	419	26	380
7/8	166	559	131	361	188	167	402	202	184	179	130	254
7/9	173	601	59	139	249	173	320	269	199	476	67	266
7/10	67	948	141	97	310	246	192	31	197	433	235	266
7/11	144	1295	135	116	42	353	224	421	400	130	145	326
7/12	49	759	776	134	136	82	149	714	61	191	243	305
7/13	68	477	137	128	241	256	296	268	153	44	254	207
7/14	60	477	103	247	304	495	327	150	259	46	78	247

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Appendix D1.–Page 2 of 2.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
7/15	53	218	128	340	194	289	374	374	170	54	96	220
7/16	80	46	191	281	63	147	124	261	170	104	63	147
7/17	55	363	463	195	61	76	124	265	215	27	60	184
7/18	55	401	557	276	97	339	148	342	155	154	52	252
7/19	30	406	521	286	85	128	170	247	177	128	39	218
7/20	76	514	562	322	73	76	35	184	206	107	9	215
7/21	128	341	368	277	182	153	150	131	107	117	27	195
7/22	83	276	298	142	200	225	73	103	89	95	39	158
7/23	19	267	231	27	130	199	125	91	107	44	66	124
7/24	3	154	40	94	148	171	138	24	33	29	56	83
7/25	11	177	167	79	71	37	82	66	30	36	48	76
7/26	44	194	136	135	78	54	76	87	71	5	37	88
7/27	38	42	61	99	29	99	35	55	37	11	33	51
7/28	88	20	66	70	77	81	54	24	13	13	25	51
7/29	50	62	69	37	28	49	88	65	17	14	44	48
7/30	45	118	59	63	43	39	36	43	24	0	19	47
7/31	49	157	46	31	28	76	10	76	23	0	19	49
8/1	55	155	25	26	55	55	13	29	15	4	17	43
8/2	19	76	14	23	16	36	13	33	19	9	12	26
8/3	30	91	26	83	13	33	9	11	22	15	8	33
8/4	8	137	27	38	10	38	9	14	8	15	17	31
8/5	7	89	18	22	18	28	11	17	9	20	6	24
8/6	3	33	19	27	18	32	9	15	3	10	9	17
8/7	11	49	20	4	17	20	7	28	3	2	6	16
8/8	16	40	11	7	8	9	4	13	2	5	7	11
8/9	5	24	2	7	7	7	6	18	0	0	6	8
8/10	10	2	17	7	2	14	8	3	2	7	11	7
8/11	5	12	8	3	5	7	2	0	0	2	3	4
8/12	4	19	0	4	7	9	2	1	0	7	5	5
8/13	10	4	2	7	5	15	0	5	2	2	3	5
8/14	8	21	7	1	4	3	4	4	6	2	2	6
8/15	7	19	2	4	2	0	2	0	4	2	3	4
8/16	6	10	2	0	5	7	0	2	2	2	0	4
8/17	8	3	1	0	9	4	0	0	0	2	2	3
8/18	0	9	0	2	9	2	0	2	0	5	2	3
8/19	0	5	0	0	0	2	0	0	0	5	0	1
8/20	0	11	2	0	0	0	0	0	2	3	2	2
8/21	3	15	1	0	0	2	0		0	2	2	2
8/22	3	0	0	0	7	4	0		0	0	4	1
8/23	1	0	0	0	2	2	0		2	4	0	1
8/24	1			0	0	2	0		1	2	2	1

Note: Date with no data indicates day when the project was not operational.

Appendix D2.–Historical cumulative mean tidal catch per unit effort for chum salmon catches in the Bethel test fishery, 2004–2014.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
6/1	0	0	0	0	0	0	0	0		0	3	0
6/2	3	0	0	0	0	0	0	0	0	0	8	0
6/3	3	0	0	0	0	0	0	0	0	0	8	0
6/4	8	0	0	0	0	0	4	3	0	0	11	1
6/5	11	0	3	0	0	3	6	3	0	0	14	3
6/6	11	0	9	0	0	4	6	3	3	0	14	4
6/7	11	0	9	3	0	4	6	3	3	0	21	4
6/8	14	0	12	3	6	6	6	6	3	0	26	6
6/9	22	0	12	3	9	9	6	11	3	0	39	7
6/10	22	0	15	8	9	9	9	17	8	0	60	10
6/11	25	13	35	11	12	9	9	22	8	0	76	14
6/12	34	25	41	11	18	12	15	22	8	0	105	19
6/13	71	38	133	23	18	14	26	31	16	4	125	37
6/14	110	49	210	34	20	20	31	39	24	4	169	54
6/15	144	87	266	57	41	42	50	60	24	14	236	79
6/16	179	95	350	74	66	69	86	63	27	37	255	105
6/17	229	131	499	94	80	75	133	85	42	48	316	141
6/18	310	188	747	110	94	91	386	135	57	69	365	219
6/19	371	252	927	138	106	99	542	199	98	115	532	285
6/20	450	537	1,012	258	161	105	588	241	170	139	686	366
6/21	547	844	1,482	343	190	135	764	276	386	235	731	520
6/22	659	1,288	1,595	407	264	149	954	371	552	313	886	655
6/23	959	1,587	1,916	506	337	301	1,049	414	704	511	994	828
6/24	1,260	1,817	2,188	632	437	397	1,163	433	798	669	1,120	979
6/25	1,583	1,918	2,412	840	598	532	1,224	597	989	805	1,194	1,150
6/26	1,926	2,077	2,646	1,075	753	783	1,340	769	1,110	881	1,434	1,336
6/27	2,014	2,183	2,941	1,308	921	904	1,524	963	1,386	979	1,608	1,512
6/28	2,271	2,273	3,402	1,783	1,099	1,028	1,613	1,165	1,495	1,007	1,851	1,714
6/29	2,514	2,631	4,031	2,589	1,176	1,407	1,738	1,607	1,801	1,020	2,155	2,051
6/30	2,653	2,989	4,660	2,917	1,550	1,800	1,931	2,223	2,189	1,297	2,596	2,421
7/1	2,690	3,455	5,530	3,341	2,010	1,959	2,196	2,812	2,350	1,349	2,836	2,769
7/2	2,736	3,982	6,437	3,861	2,377	2,104	2,378	3,353	2,653	1,553	3,144	3,144
7/3	2,819	4,650	6,937	4,252	2,680	2,339	2,838	3,750	2,756	1,812	3,644	3,483
7/4	2,965	5,464	7,424	4,736	2,953	2,663	3,172	4,127	2,998	2,116	3,707	3,862
7/5	3,120	6,477	7,629	5,314	3,197	3,000	3,380	4,504	3,239	2,496	3,992	4,235
7/6	3,226	7,542	8,053	5,927	3,391	3,530	3,478	4,854	3,423	2,726	4,307	4,615
7/7	3,395	8,496	8,278	6,414	3,471	3,917	3,802	5,340	3,695	3,145	4,333	4,995
7/8	3,561	9,055	8,409	6,775	3,660	4,083	4,205	5,542	3,879	3,324	4,463	5,249
7/9	3,733	9,656	8,468	6,914	3,909	4,256	4,524	5,811	4,078	3,800	4,530	5,515
7/10	3,800	10,604	8,609	7,011	4,219	4,502	4,716	5,843	4,275	4,233	4,765	5,781
7/11	3,945	11,899	8,743	7,127	4,260	4,855	4,940	6,264	4,675	4,363	4,910	6,107
7/12	3,993	12,658	9,519	7,261	4,396	4,937	5,089	6,978	4,736	4,554	5,153	6,412
7/13	4,061	13,135	9,656	7,389	4,637	5,193	5,385	7,245	4,889	4,599	5,407	6,619
7/14	4,122	13,612	9,759	7,636	4,941	5,688	5,712	7,395	5,148	4,644	5,484	6,866

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Appendix D2.–Page 2 of 2.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
7/15	4,175	13,830	9,887	7,976	5,135	5,977	6,087	7,769	5,317	4,698	5,581	7,085
7/16	4,254	13,876	10,078	8,257	5,198	6,124	6,210	8,031	5,487	4,803	5,644	7,232
7/17	4,309	14,239	10,541	8,452	5,259	6,200	6,334	8,296	5,702	4,829	5,704	7,416
7/18	4,364	14,640	11,098	8,728	5,355	6,538	6,482	8,637	5,858	4,983	5,756	7,668
7/19	4,395	15,047	11,619	9,014	5,441	6,667	6,652	8,884	6,035	5,111	5,796	7,886
7/20	4,471	15,560	12,181	9,337	5,514	6,742	6,686	9,069	6,240	5,218	5,804	8,102
7/21	4,599	15,901	12,549	9,613	5,696	6,895	6,836	9,200	6,347	5,336	5,832	8,297
7/22	4,681	16,177	12,847	9,755	5,896	7,120	6,909	9,303	6,436	5,431	5,871	8,456
7/23	4,700	16,445	13,078	9,782	6,026	7,319	7,034	9,394	6,543	5,475	5,937	8,580
7/24	4,703	16,598	13,118	9,876	6,174	7,490	7,172	9,418	6,576	5,504	5,992	8,663
7/25	4,714	16,775	13,284	9,955	6,245	7,527	7,253	9,484	6,606	5,541	6,040	8,738
7/26	4,758	16,969	13,421	10,090	6,322	7,581	7,329	9,572	6,677	5,546	6,078	8,827
7/27	4,797	17,011	13,481	10,189	6,352	7,679	7,364	9,627	6,715	5,556	6,111	8,877
7/28	4,884	17,031	13,547	10,259	6,429	7,760	7,419	9,651	6,728	5,570	6,136	8,928
7/29	4,935	17,094	13,616	10,296	6,456	7,809	7,507	9,715	6,745	5,584	6,180	8,976
7/30	4,980	17,211	13,675	10,359	6,499	7,848	7,542	9,759	6,769	5,584	6,199	9,023
7/31	5,029	17,368	13,721	10,390	6,527	7,924	7,552	9,835	6,791	5,584	6,217	9,072
8/1	5,084	17,523	13,746	10,416	6,582	7,979	7,565	9,864	6,806	5,587	6,234	9,115
8/2	5,103	17,599	13,760	10,439	6,598	8,015	7,579	9,896	6,825	5,596	6,246	9,141
8/3	5,133	17,690	13,786	10,522	6,611	8,048	7,588	9,908	6,847	5,611	6,254	9,174
8/4	5,140	17,827	13,814	10,561	6,621	8,086	7,597	9,922	6,855	5,626	6,272	9,205
8/5	5,147	17,916	13,832	10,583	6,639	8,113	7,607	9,939	6,864	5,647	6,277	9,229
8/6	5,149	17,948	13,851	10,609	6,658	8,146	7,617	9,954	6,867	5,657	6,286	9,246
8/7	5,161	17,998	13,871	10,613	6,675	8,166	7,623	9,982	6,870	5,658	6,292	9,262
8/8	5,177	18,038	13,883	10,620	6,683	8,174	7,627	9,994	6,872	5,663	6,299	9,273
8/9	5,182	18,062	13,884	10,627	6,690	8,182	7,633	10,012	6,872	5,663	6,305	9,281
8/10	5,192	18,064	13,902	10,634	6,692	8,196	7,641	10,014	6,874	5,671	6,315	9,288
8/11	5,197	18,077	13,910	10,637	6,696	8,203	7,643	10,014	6,874	5,672	6,319	9,292
8/12	5,200	18,096	13,910	10,641	6,704	8,212	7,645	10,015	6,874	5,679	6,324	9,298
8/13	5,211	18,099	13,912	10,648	6,709	8,227	7,645	10,020	6,876	5,681	6,327	9,303
8/14	5,219	18,121	13,919	10,649	6,713	8,230	7,649	10,025	6,882	5,682	6,329	9,309
8/15	5,226	18,139	13,921	10,653	6,714	8,230	7,651	10,025	6,886	5,684	6,332	9,313
8/16	5,232	18,149	13,923	10,653	6,720	8,238	7,651	10,027	6,888	5,686	6,332	9,316
8/17	5,240	18,153	13,924	10,653	6,729	8,241	7,651	10,027	6,888	5,687	6,334	9,319
8/18	5,240	18,162	13,924	10,654	6,737	8,243	7,651	10,028	6,888	5,693	6,336	9,322
8/19	5,240	18,166	13,924	10,654	6,737	8,245	7,651	10,028	6,888	5,698	6,336	9,323
8/20	5,240	18,177	13,925	10,654	6,737	8,245	7,651	10,028	6,890	5,701	6,338	9,325
8/21	5,242	18,192	13,926	10,654	6,737	8,247	7,651	10,028	6,890	5,703	6,339	9,327
8/22	5,245	18,192	13,926	10,654	6,744	8,250	7,651		6,890	5,703	6,343	9,328
8/23	5,247	18,192	13,926	10,654	6,746	8,252	7,651		6,890	5,706	6,343	9,329
8/24	5,248			10,654	6,746	8,254	7,651		6,890	5,708	6,345	9,330

Note: Date with no data indicates day when the project was not operational.

Appendix D3.–Historical percent passage of chum salmon at the Bethel test fish site, 2004–2014.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
6/1	0	0	0	0	0	0	0	0	0	0	0	0
6/2	0	0	0	0	0	0	0	0	0	0	0	0
6/3	0	0	0	0	0	0	0	0	0	0	0	0
6/4	0	0	0	0	0	0	0	0	0	0	0	0
6/5	0	0	0	0	0	0	0	0	0	0	0	0
6/6	0	0	0	0	0	0	0	0	0	0	0	0
6/7	0	0	0	0	0	0	0	0	0	0	0	0
6/8	0	0	0	0	0	0	0	0	0	0	0	0
6/9	0	0	0	0	0	0	0	0	0	0	1	0
6/10	0	0	0	0	0	0	0	0	0	0	1	0
6/11	0	0	0	0	0	0	0	0	0	0	1	0
6/12	1	0	0	0	0	0	0	0	0	0	2	0
6/13	1	0	1	0	0	0	0	0	0	0	2	0
6/14	2	0	2	0	0	0	0	0	0	0	3	1
6/15	3	0	2	1	1	1	1	1	0	0	4	1
6/16	3	1	3	1	1	1	1	1	0	1	4	1
6/17	4	1	4	1	1	1	2	1	1	1	5	2
6/18	6	1	5	1	1	1	5	1	1	1	6	2
6/19	7	1	7	1	2	1	7	2	1	2	8	3
6/20	9	3	7	2	2	1	8	2	2	2	11	4
6/21	10	5	11	3	3	2	10	3	6	4	12	6
6/22	13	7	11	4	4	2	12	4	8	5	14	7
6/23	18	9	14	5	5	4	14	4	10	9	16	9
6/24	24	10	16	6	6	5	15	4	12	12	18	11
6/25	30	11	17	8	9	6	16	6	14	14	19	13
6/26	37	11	19	10	11	9	18	8	16	15	23	15
6/27	38	12	21	12	14	11	20	10	20	17	25	18
6/28	43	12	24	17	16	12	21	12	22	18	29	20
6/29	48	14	29	24	17	17	23	16	26	18	34	23
6/30	51	16	33	27	23	22	25	22	32	23	41	27
7/1	51	19	40	31	30	24	29	28	34	24	45	31
7/2	52	22	46	36	35	25	31	33	38	27	50	35
7/3	54	26	50	40	40	28	37	37	40	32	57	38
7/4	57	30	53	44	44	32	41	41	43	37	58	42
7/5	59	36	55	50	47	36	44	45	47	44	63	46
7/6	61	41	58	56	50	43	45	48	50	48	68	50
7/7	65	47	59	60	51	47	50	53	54	55	68	54
7/8	68	50	60	64	54	49	55	55	56	58	70	57
7/9	71	53	61	65	58	52	59	58	59	67	71	60
7/10	72	58	62	66	63	55	62	58	62	74	75	63
7/11	75	65	63	67	63	59	65	62	68	76	77	66
7/12	76	70	68	68	65	60	67	70	69	80	81	69
7/13	77	72	69	69	69	63	70	72	71	81	85	71
7/14	79	75	70	72	73	69	75	74	75	81	86	74
7/15	80	76	71	75	76	72	80	77	77	82	88	77
7/16	81	76	72	77	77	74	81	80	80	84	89	78
7/17	82	78	76	79	78	75	83	83	83	85	90	80
7/18	83	80	80	82	79	79	85	86	85	87	91	83
7/19	84	83	83	85	81	81	87	89	88	90	91	85
7/20	85	86	87	88	82	82	87	90	91	91	91	87
7/21	88	87	90	90	84	84	89	92	92	94	92	89

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Appendix D3.–Page 2 of 2.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
7/22	89	89	92	92	87	86	90	93	93	95	93	91
7/23	90	90	94	92	89	89	92	94	95	96	94	92
7/24	90	91	94	93	92	91	94	94	95	96	94	93
7/25	90	92	95	93	93	91	95	95	96	97	95	94
7/26	91	93	96	95	94	92	96	95	97	97	96	95
7/27	91	94	97	96	94	93	96	96	97	97	96	95
7/28	93	94	97	96	95	94	97	96	98	98	97	96
7/29	94	94	98	97	96	95	98	97	98	98	97	96
7/30	95	95	98	97	96	95	99	97	98	98	98	97
7/31	96	95	99	98	97	96	99	98	99	98	98	97

Note: The boxes represent the central 50% of the run and the shaded cells represent the median passage date of the run.

APPENDIX E: HISTORICAL COHO SALMON DATA

Appendix E1.–Historical daily mean tidal catch per unit effort for coho salmon catches in the Bethel test fishery, 2004–2014.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
7/6	3	0	0	0	0	0	0	0	0	0	7	0
7/7	0	0	0	0	0	0	0	0	0	0	0	0
7/8	0	0	0	5	0	0	0	0	0	0	0	0
7/9	9	0	0	0	0	0	0	0	0	2	0	1
7/10	3	0	0	0	0	0	0	0	0	0	2	0
7/11	5	0	3	0	6	5	0	0	0	0	0	2
7/12	0	0	16	0	0	3	0	0	0	0	3	2
7/13	6	0	0	0	0	1	0	0	0	2	0	1
7/14	5	0	0	15	3	0	0	3	0	0	3	2
7/15	3	2	1	7	8	0	0	14	0	22	2	6
7/16	3	0	7	13	14	4	3	0	2	16	16	6
7/17	22	5	22	24	22	0	0	5	2	8	12	11
7/18	22	6	50	19	16	21	0	4	2	6	12	15
7/19	42	13	50	39	25	16	3	13	2	21	14	22
7/20	54	16	78	28	34	29	2	11	3	13	13	27
7/21	55	2	54	20	40	61	6	10	3	21	7	27
7/22	109	7	40	51	63	124	17	8	7	28	13	45
7/23	48	6	31	16	55	91	11	27	15	17	51	32
7/24	63	18	13	51	80	81	24	11	19	19	39	38
7/25	92	16	18	82	114	55	15	36	26	28	60	48
7/26	106	20	26	110	70	114	24	58	37	26	71	59
7/27	47	46	37	72	46	115	21	40	45	23	122	49
7/28	136	29	118	54	190	211	47	56	10	65	66	92
7/29	265	34	179	92	235	106	58	82	54	41	107	115
7/30	262	43	143	93	196	75	145	59	67	21	116	110
7/31	365	82	99	146	177	306	48	141	21	37	156	142
8/1	314	142	62	72	223	175	67	223	39	47	78	136
8/2	139	74	111	163	221	184	43	324	78	60	103	140
8/3	216	62	92	348	192	223	49	126	127	102	118	154
8/4	211	93	94	456	224	190	53	202	61	169	200	175
8/5	219	177	103	258	306	228	80	295	123	234	58	202
8/6	163	220	113	257	247	176	91	183	85	144	104	168
8/7	274	354	108	15	225	167	208	244	78	44	338	172
8/8	339	317	99	84	132	185	230	99	80	69	253	163
8/9	145	211	60	129	210	186	129	213	64	139	195	149
8/10	554	180	192	44	29	134	246	202	102	249	384	193
8/11	210	112	173	59	172	97	146	67	27	243	250	131
8/12	189	120	176	29	228	122	69	74	112	92	143	121
8/13	363	38	231	80	189	187	10	147	110	55	242	141
8/14	233	85	106	53	126	193	31	90	97	121	137	113
8/15	468	81	167	70	219	76	18	40	101	26	153	126
8/16	268	128	48	24	248	79	12	44	136	104	205	109
8/17	167	100	62	19	233	96	12	15	153	104	173	96
8/18	79	126	82	45	181	41	0	43	149	93	96	84

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Appendix E1.–Page 2 of 2.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
8/19	112	160	58	57	137	55	38	11	83	112	86	82
8/20	48	170	19	55	139	45	35	11	66	45	96	63
8/21	64	171	18	39	49	80	30		59	49	109	62
8/22	105	115	4	16	55	74	2		51	68	82	55
8/23	88	99	0	7	37	61	4		50	50	74	44
8/24	81			13	81	23	2		29	31	128	37
8/25	75								36			55
8/26	119								28			74
8/27	70											70
8/28	64											64
8/29	81											81

Note: Date with no data indicates day when the project was not operational.

Appendix E2.–Historical cumulative mean tidal catch per unit effort for coho salmon catches in the Bethel test fishery, 2004–2014.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
7/6	3	0	0	0	0	0	0	0	0	0	7	0
7/7	0	0	0	0	0	0	0	0	0	0	7	0
7/8	0	0	0	5	0	0	0	0	0	0	7	0
7/9	9	0	0	5	0	0	0	0	0	2	7	2
7/10	11	0	0	5	0	0	0	0	0	2	9	2
7/11	16	0	3	5	6	5	0	0	0	2	9	4
7/12	16	0	18	5	6	8	0	0	0	2	12	5
7/13	23	0	18	5	6	10	0	0	0	4	12	6
7/14	27	0	18	20	8	10	0	3	0	4	14	9
7/15	30	2	19	26	16	10	0	16	0	26	17	15
7/16	33	2	26	39	30	14	3	16	2	42	33	21
7/17	56	7	48	63	52	14	3	22	4	50	45	32
7/18	78	13	98	82	68	35	3	26	6	56	57	46
7/19	120	26	148	120	93	51	5	39	8	77	70	69
7/20	173	41	226	148	127	80	7	50	12	90	83	96
7/21	228	44	280	169	167	141	13	60	15	111	90	123
7/22	337	51	320	219	231	265	30	68	22	139	102	168
7/23	385	57	352	235	285	356	40	95	37	156	154	200
7/24	447	74	365	286	365	436	64	106	57	175	192	238
7/25	539	90	382	368	480	491	79	142	83	203	252	286
7/26	645	110	408	478	550	606	103	200	120	228	324	345
7/27	692	156	445	550	596	721	124	240	165	252	446	394
7/28	828	185	563	605	785	931	170	296	175	317	512	486
7/29	1,093	219	742	697	1,020	1,037	229	378	229	358	619	600
7/30	1,354	262	885	790	1,216	1,112	374	437	296	379	736	711
7/31	1,720	344	985	936	1,393	1,418	421	578	317	416	892	853
8/1	2,034	486	1,047	1,008	1,616	1,593	488	802	355	463	969	989
8/2	2,173	561	1,158	1,171	1,837	1,777	531	1,126	434	523	1,073	1,129
8/3	2,389	622	1,250	1,519	2,030	2,000	580	1,252	561	624	1,191	1,283
8/4	2,599	715	1,344	1,975	2,253	2,190	634	1,454	622	793	1,391	1,458
8/5	2,819	892	1,447	2,234	2,560	2,418	713	1,749	745	1,027	1,448	1,660
8/6	2,982	1,112	1,560	2,491	2,806	2,595	804	1,932	830	1,171	1,552	1,828
8/7	3,255	1,466	1,668	2,506	3,032	2,762	1,011	2,177	907	1,215	1,890	2,000
8/8	3,594	1,783	1,767	2,590	3,163	2,946	1,242	2,276	988	1,284	2,143	2,163
8/9	3,740	1,994	1,827	2,719	3,373	3,132	1,371	2,489	1,051	1,423	2,338	2,312
8/10	4,294	2,174	2,019	2,762	3,402	3,266	1,616	2,691	1,153	1,672	2,723	2,505
8/11	4,505	2,286	2,193	2,821	3,573	3,363	1,762	2,758	1,181	1,916	2,972	2,636
8/12	4,694	2,406	2,369	2,850	3,801	3,485	1,831	2,832	1,292	2,008	3,115	2,757
8/13	5,057	2,444	2,601	2,931	3,990	3,672	1,840	2,979	1,403	2,063	3,357	2,898
8/14	5,290	2,529	2,707	2,983	4,115	3,865	1,871	3,069	1,500	2,185	3,494	3,011
8/15	5,758	2,610	2,874	3,053	4,334	3,940	1,889	3,109	1,601	2,210	3,648	3,138
8/16	6,026	2,737	2,921	3,077	4,582	4,019	1,901	3,153	1,737	2,315	3,853	3,247
8/17	6,193	2,837	2,984	3,096	4,815	4,115	1,913	3,168	1,890	2,419	4,026	3,343
8/18	6,272	2,963	3,065	3,140	4,995	4,156	1,913	3,212	2,039	2,512	4,121	3,427

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Appendix E2.–Page 2 of 2.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
8/19	6,385	3,123	3,123	3,197	5,133	4,211	1,951	3,223	2,122	2,624	4,208	3,509
8/20	6,433	3,292	3,142	3,252	5,272	4,256	1,986	3,234	2,187	2,669	4,304	3,572
8/21	6,497	3,464	3,160	3,291	5,320	4,336	2,016		2,247	2,717	4,413	3,672
8/22	6,602	3,579	3,164	3,307	5,376	4,411	2,018		2,297	2,785	4,495	3,727
8/23	6,690	3,678	3,164	3,314	5,413	4,472	2,022		2,347	2,834	4,569	3,770
8/24	6,771			3,328	5,494	4,495	2,024		2,376	2,865	4,697	3,907
8/25	6,846								2,411	2,865	4,697	4,041
8/26	6,965								2,440	2,865	4,697	4,090
8/27	7,035									2,865	4,697	4,950
8/28	7,099									2,865	4,697	4,982
8/29	7,180											7,180

Note: Date with no data indicates day when the project was not operational.

Appendix E3.–Historical percent passage of coho salmon at the Bethel test fish site, Bethel test fishery, 2004–2014.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	10-year average
7/6	0	0	0	0	0	0	0	0	0	0	0	0
7/7	0	0	0	0	0	0	0	0	0	0	0	0
7/8	0	0	0	0	0	0	0	0	0	0	0	0
7/9	0	0	0	0	0	0	0	0	0	0	0	0
7/10	0	0	0	0	0	0	0	0	0	0	0	0
7/11	0	0	0	0	0	0	0	0	0	0	0	0
7/12	0	0	1	0	0	0	0	0	0	0	0	0
7/13	0	0	1	0	0	0	0	0	0	0	0	0
7/14	0	0	1	1	0	0	0	0	0	0	0	0
7/15	0	0	1	1	0	0	0	1	0	1	0	0
7/16	0	0	1	1	1	0	0	1	0	1	1	1
7/17	1	0	2	2	1	0	0	1	0	2	1	1
7/18	1	0	3	2	1	1	0	1	0	2	1	1
7/19	2	1	5	4	2	1	0	1	0	3	1	2
7/20	2	1	7	4	2	2	0	2	0	3	2	2
7/21	3	1	9	5	3	3	1	2	1	4	2	3
7/22	5	1	10	7	4	6	1	2	1	5	2	4
7/23	5	2	11	7	5	8	2	3	2	5	3	5
7/24	6	2	12	9	7	10	3	3	2	6	4	6
7/25	8	2	12	11	9	11	4	4	3	7	5	7
7/26	9	3	13	14	10	13	5	6	5	8	7	9
7/27	10	4	14	17	11	16	6	7	7	9	9	10
7/28	12	5	18	18	14	21	8	9	7	11	11	12
7/29	15	6	23	21	19	23	11	12	9	12	13	15
7/30	19	7	28	24	22	25	18	14	12	13	16	18
7/31	24	9	31	28	25	32	21	18	13	15	19	22
8/1	28	13	33	30	29	35	24	25	15	16	21	25
8/2	30	15	37	35	33	40	26	35	18	18	23	29
8/3	33	17	40	46	37	44	29	39	23	22	25	33
8/4	36	19	42	59	41	49	31	45	25	28	30	38
8/5	39	24	46	67	47	54	35	54	31	36	31	43
8/6	42	30	49	75	51	58	40	60	34	41	33	48
8/7	45	40	53	75	55	61	50	67	37	42	40	53
8/8	50	48	56	78	58	66	61	70	40	45	46	57
8/9	52	54	58	82	61	70	68	77	43	50	50	61
8/10	60	59	64	83	62	73	80	83	47	58	58	67
8/11	63	62	69	85	65	75	87	85	48	67	63	71
8/12	65	65	75	86	69	78	90	88	53	70	66	74
8/13	70	66	82	88	73	82	91	92	57	72	71	77
8/14	74	69	86	90	75	86	92	95	61	76	74	80
8/15	80	71	91	92	79	88	93	96	66	77	78	83
8/16	84	74	92	92	83	89	94	97	71	81	82	86
8/17	86	77	94	93	88	92	94	98	77	84	86	88
8/18	87	81	97	94	91	92	94	99	84	88	88	91
8/19	89	85	99	96	93	94	96	100	87	92	90	93
8/20	90	90	99	98	96	95	98	100	90	93	92	95
8/21	90	94	100	99	97	96	100		92	95	94	96
8/22	92	97	100	99	98	98	100		94	97	96	97
8/23	93	100	100	100	99	99	100		96	99	97	98
8/24	94			100	100	100	100		97	100	100	99

Note: Boxes represent the central 50% of the run; shaded cells represent the median passage date of the run.

APPENDIX F: HISTORICAL CLIMATOLOGICAL DATA

Appendix F1.–Historical daily surface water temperature (C) of the Kuskokwim River at the Bethel test fish site, 2004–2014.

												Historical Summary		
Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Mean	Min.	Max.
6/1	14	16	12			10	13	11		8	9	12	9	16
6/2	12	12	12		12	10	12	11	11	7	9	11	7	15
6/3	12	13	11		11	10	12	12	9	10	9	11	7	16
6/4	12	13	11		11	10	12	11	10	9	10	11	7	15
6/5	13	10	10		11	10	13	11	11	11	11	11	7	16
6/6	14	12	12		10	10	13	12	11	11	13	11	7	16
6/7	14	11	11		11	10	13	11	10	11	13	11	7	16
6/8	14	11	10	11	11	10	13	12	10	11	12	11	7	15
6/9	14	13	10	11	10	10	13	11	10	10	11	11	8	16
6/10	14	14	11	11	11	11	12	12	10	10	12	11	7	14
6/11	13	11	10	12	11	12	14	12	11	10	11	11	8	15
6/12	14	12	10	13	10	13	12	12	11	12	12	12	8	14
6/13	15	12	9	13	11	14	9	11	10	13	12	12	8	16
6/14	15	12	10	13	12	14	10	11	10	14	12	12	8	16
6/15	14	13	11	12	12	14	9	11	12	14	12	12	9	15
6/16	15	13	12	13	12	14	11	12	12	14	12	13	10	19
6/17	14	13	13	12	13	15	11	12	13	14	12	13	10	16
6/18	15	13	13	12	12	14	11	13	13	18	12	13	10	16
6/19	14	16	14	12	12	14	12	13	13	17	13	13	11	16
6/20	14	14	15	14	12	14	12	13	13	17	13	13	10	16
6/21	15	15	14	13	12	14	12	14	14	17	14	13	10	16
6/22	20	16	15	13	13	13	15	11	14	16	14	14	10	20
6/23	21	16	14	14	13	14	15	12	14	15	14	14	10	21
6/24	19	16		13	13	12	13	13	14	15	15	13	11	19
6/25	19	16	14	14	14	12	15	12	13	15	15	13	10	19
6/26	15	17	15	14	14	13	16	11	13	15	15	14	11	18
6/27	15	18	15	14	14	13	14	13	13	15	14	13	10	18
6/28	17	18		13	14	13	15	12	13	16	15	14	11	18
6/29	17	17		14	13	12	14	12	14	15	14	14	10	18
6/30	17	17	14	14	13	14	15	12	14	15	15	14	11	18
7/1	18	17	13	14	14	13	15	12	13	15	15	14	12	18
7/2	18	17	14	14	14	17	16	12	13	14	15	15	12	18
7/3	18	17	14	14	13	15	16	13	13	13	15	14	12	20
7/4	17	17		14	13	15	15	12	13	12	16	15	12	19
7/5	17	17	16	14	13	17	15	12	13	12	17	15	12	20
7/6	17	19	16	16	15	16	15	12	14	12	17	15	11	20
7/7	16	19	15	16	14	16	15	12	15	12	17	15	10	20
7/8	17	18	17	16	14	16	15	12	15	12	17	15	11	19
7/9	18	18	17	17	14	17	15	12	14	12	17	15	10	18
7/10	18	12	17	16	14	17	15	13	14	12	16	15	12	18
7/11	17	16	16	17	15	18	16	13	15	13	16	15	11	18
7/12	19	16	18	18	14	17	15	12	14	14	16	15	11	19
7/13	18	16	20	17	14	19	15	12	12	15	16	15	11	20
7/14	18	15	19	16	12	17	16	11	11	15	16	15	11	19
7/15	19	14	15	13	11	18	16	11	12	14	16	15	11	19
7/16	19	14	14	15	12	17	15	11	12	14	16	15	11	19

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Appendix F1.–Page 2 of 2.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Historical Summary Mean	Min.	Max.
7/17	19	17	15	15	11	17	15	12	12	15	15	15	11	19
7/18	19	17	14	15	12	16	15	12	12	15	15	15	12	19
7/19	18	16	16	16	12	16	15	13	12	15	14	15	12	19
7/20	24	14	15	15	12	14	14	13	12	14	14	15	12	24
7/21	18	15	15	15	12	15	13	12	12	14	14	15	12	20
7/22	19	15	18	14	12	15	14	11	12	14	14	15	11	21
7/23	19	15	16	14	12	15	14	13	13	15	14	15	11	21
7/24	17	15	17	14	13	15	13	13	13	15	14	15	11	21
7/25	18	15	16	15	13	16	13	13	13	15	13	15	12	18
7/26	17	18	16	15	12	15	13	14	12	17	13	15	12	18
7/27	17	18	16	16	13	14	13	15	12	17	14	15	12	18
7/28	17	17	15	16	12	14	13	15	12	16	14	15	12	17
7/29	14	18	14	16	12	14	13	15	12	18	14	15	12	18
7/30	17	18	14	15	14	14	13	14	12	19	14	15	11	18
7/31	19	17	13	15	14	13	13	13	12	19	15	15	11	19
8/1	13	16	14	15	13	13	14	13	12	19	15	14	11	19
8/2	16	17	14	14	13	13	14	13	12	19	15	14	11	18
8/3	12	17	15	15	13	13	14	12	11	18	15	14	11	18
8/4	16	17	14	14	14	14	14	12	11	17	15	14	11	18
8/5	16	16	14	14	14	13	14	12	12	17	16	14	10	18
8/6	16	16	14	14	14	13	14	12	12	17	16	14	10	17
8/7	16	15	13	14	14	14	13	11	11	16	16	14	11	18
8/8	16	16	14	14	14	15	13	11	11	15	16	14	10	18
8/9	16	16	13	14	14	15	13	11	12	15	16	14	11	18
8/10	16	16	14	14	14	12	12	12	11	14	16	14	10	16
8/11	16	18	15	14	14	12	12	11	13	14	16	14	11	18
8/12	16	18	13	14	15	15	11	10	14	14	16	13	10	18
8/13	16	19	13	14	15	9	12	10	13	14	16	13	9	19
8/14	16	19	13	14	14	10	12	10	15	14	16	13	10	19
8/15	17	19	14	14	14	15	12	10	14	14	16	13	10	19
8/16	18	18	13	15	14	10	12	10	14	15	15	13	10	18
8/17	17	18	13	15	14	10	12	10	13	15	15	13	10	18
8/18	17	17	13	14	14	13	12	11	12	14	15	13	9	17
8/19	19	17	12	15	14	13	11	11	12	14	15	13	10	19
8/20	19	16	13	14	14	13	12	11		14	14	13	10	19
8/21	18	14	12	14	14	13	12			14	14	13	10	18
8/22	17	14		14	14	12	12			14	14	12	9	17
8/23	17	12		13	14	12	11			13	14	12	9	17
8/24	17			13	14		12			13	14	12	8	17
Average	16	15	14	14	13	14	13	12	12	14	14	14	10	18
Min.	12	10	9	11	10	9	9	10	9	7	9	11	7	14
Max.	24	19	20	18	15	19	16	15	15	19	17	15	12	24

Note: Value entered was lowest value for that day. Blank space indicates no observation taken.

Appendix F2.–Historical daily water clarity measurements of the Kuskokwim River at the Bethel test fish site, 2004–2014.

												Historical Summary		
Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Mean	Min.	Max.
6/1	0.5	0.5	0.36	0.9		0.5	0.5	0.4			0.7	0.5	0.1	0.9
6/2	0.4	0.4	0.33	0.8	0.5	0.5	0.4	0.7	0.4	0.2	0.9	0.5	0.2	1.2
6/3	0.4	0.4	0.4	0.7	0.7	0.5	0.5	0.6	0.4	0.1	0.7	0.5	0.1	1.1
6/4	0.4	0.5	0.4	0.9	0.6	0.6	0.5	0.7	0.4	0.2	0.6	0.5	0.1	1.1
6/5	0.3	0.5	0.3	0.8	0.7	0.4	0.5	0.5	0.4	0.2	0.6	0.5	0.1	1.6
6/6	0.2	0.5	0.4	0.8	0.7	0.4	0.6	0.6	0.5	0.2	0.6	0.5	0.2	1.6
6/7	0.4	0.6	0.3	0.9	0.7	0.5	0.7	0.5	0.5	0.2	0.8	0.6	0.2	1.6
6/8	0.4	0.5	0.5	1.0	0.8	0.4	0.7	0.5	0.5	0.2	0.7	0.5	0.2	1.6
6/9	0.5	0.5	0.4	1.0	0.7	0.7	0.7	0.4	0.4	0.2	1.1	0.6	0.2	1.8
6/10	0.5	0.6	0.4	1.0	0.7	0.5	0.7	0.4	0.5	0.2	0.9	0.6	0.2	1.6
6/11	0.4	0.6	0.3	1.0	0.7	0.7	0.7	0.3	0.6	0.2	1.1	0.6	0.2	1.5
6/12	0.5	0.5	0.4	0.9	0.7	0.6	0.6	0.3	0.6	0.2	1.4	0.6	0.2	1.3
6/13	0.4	0.5	0.4	0.8	0.8	0.8	0.7	0.3	0.6	0.3	1.1	0.6	0.2	1.3
6/14	0.6	0.6	0.5	1.0	1.1	0.9	0.6	0.3	0.6	0.3	1.0	0.6	0.2	1.3
6/15	0.9	0.6	0.4	1.2	0.6	0.7	0.4	0.4	0.5	0.4	1.3	0.6	0.3	1.6
6/16	0.6	0.6	0.4	1.1	0.8	0.7	0.5	0.6	0.6	0.4	1.1	0.6	0.3	1.5
6/17	0.4	0.6	0.4	1.1	0.9	0.6	0.6	0.5	0.5	0.4	1.1	0.6	0.3	1.4
6/18	0.4	0.6	0.5	1.1	0.9	0.6	0.5	0.9	0.4	0.4	0.9	0.6	0.2	1.2
6/19	0.3	0.5	0.5	1.0	0.7	0.5	0.5	0.8	0.4	0.4	0.7	0.6	0.2	1.1
6/20		0.7	0.6	1.0	0.7	0.5	0.5	0.7	0.4	0.4	0.9	0.6	0.2	1.1
6/21	0.4	0.7	0.5	1.2	0.7	0.5	0.5	1.2	0.4	0.4	0.7	0.6	0.2	1.2
6/22	0.6	0.3	0.7	1.2	0.7	0.5	0.6	1.2	0.2	0.4	0.8	0.6	0.2	1.2
6/23	0.6	0.2	0.6	1.3	0.8	0.4	0.6	1.1	0.1	0.3	1.1	0.6	0.1	1.3
6/24	0.6	0.2		1.0	0.9	0.4	0.8	1.2	0.3	0.3	1.0	0.6	0.2	1.2
6/25		0.2	0.7	1.1	0.7	0.5	0.8	1.1	0.2	0.2	0.8	0.6	0.2	1.2
6/26	0.6	0.2	0.6	0.7	0.4	0.4	0.8	0.5	0.3	0.2	0.7	0.5	0.2	1.2
6/27	0.6	0.2	0.4	1.0	0.4	0.4	0.7	0.4	0.2	0.2	0.4	0.5	0.2	1.5
6/28		0.1		0.9	0.4	0.4	0.9	0.5	0.4	0.1	0.4	0.5	0.1	1.2
6/29	0.4	0.1		0.7	0.5	0.5	0.9	0.5	0.3	0.2	0.4	0.5	0.1	1.4
6/30			0.6	0.7	0.3	0.6	1.2	0.4	0.3	0.2	0.4	0.5	0.2	1.5
7/1	0.3	0.2	0.4	0.7	0.4	0.5	1.2	0.4	0.3	0.1	0.2	0.5	0.1	1.7
7/2	0.3	0.2	0.5	0.5	0.4	0.6	1.0	0.5	0.3	0.1	0.3	0.5	0.1	1.3
7/3	0.2		0.5	0.5	0.4	0.7	1.1	0.5	0.2	0.2	0.3	0.5	0.2	1.1
7/4	0.2			0.5	0.4	0.7	1.0	0.5	0.2	0.2	0.2	0.5	0.2	1.2
7/5	0.2		0.5	0.5	0.4	0.7	0.8	0.5	0.3	0.2	0.1	0.5	0.2	0.8
7/6		0.3	0.4	0.5	0.3	0.7	0.8	0.5	0.3	0.2	0.1	0.4	0.2	0.8
7/7	0.2	0.3	0.5	0.5	0.4	1.0	0.7	0.4	0.3	0.2	0.1	0.4	0.2	1.0
7/8	0.2	0.2	0.4	0.5	0.5	1.0	0.7	0.4	0.3	0.1	0.1	0.5	0.1	1.5
7/9	0.1		0.4	0.5	0.5	1.2	0.7	0.4	0.3	0.2	0.2	0.5	0.1	1.7
7/10	0.1	0.3	0.3	0.8	0.5	1.2	0.4	0.6	0.3	0.2	0.2	0.4	0.1	1.2
7/11	0.2	0.2	0.3	0.7	0.6	1.0	0.6	0.4	0.3	0.1	0.2	0.4	0.1	1.0
7/12	0.2		0.2	0.6	0.6	0.9	0.3	0.4	0.2	0.2	0.3	0.4	0.1	0.9
7/13	0.2		0.3	0.6	0.5	1.0	0.4	0.5	0.2	0.2	0.3	0.4	0.1	1.0
7/14		0.2	0.3	0.5	0.5	0.7	0.4	0.4	0.3	0.3	0.3	0.3	0.1	0.9
7/15	0.2	0.2	0.2	0.5	0.4	0.4	0.4	0.5	0.4	0.3	0.3	0.3	0.2	1.1
7/16	0.2	0.2	0.2	0.4	0.3	0.4	0.4	0.5	0.4	0.3	0.2	0.3	0.2	0.9

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Appendix F2.–Page 2 of 2.

Date	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Historical Summary Mean	Min.	Max.
7/17		0.3	0.3	0.4	0.3	0.3	0.4	0.5	0.4	0.4	0.2	0.3	0.1	0.8
7/18		0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.2	0.3	0.2	0.8
7/19	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.4	0.3	0.4	0.2	0.3	0.1	0.8
7/20	0.2	0.2	0.2	0.3	0.3	0.2	0.5	0.5	0.5	0.4	0.2	0.3	0.1	0.7
7/21	0.2	0.3	0.2	0.3	0.2	0.2	0.5	0.5	0.5	0.4	0.3	0.3	0.1	0.8
7/22	0.2		0.3	0.5	0.3	0.2	0.3	0.5	0.6	0.4	0.3	0.3	0.1	0.8
7/23	0.2		0.3	0.5	0.3	0.2	0.4	0.3	0.7	0.3	0.2	0.3	0.2	0.7
7/24	0.2		0.3	0.3	0.3	0.2	0.4	0.3	0.7	0.3	0.2	0.3	0.2	0.8
7/25	0.2		0.3	0.5	0.4	0.2	0.3	0.3	0.7	0.2	0.3	0.3	0.1	0.7
7/26	0.2	0.3	0.4	0.6	0.4	0.2	0.2	0.3	0.4	0.1	0.3	0.3	0.1	0.6
7/27	0.2	0.2	0.4	0.6	0.4	0.2	0.1	0.4	0.7	0.1	0.4	0.3	0.1	0.7
7/28	0.3	0.3	NA	0.6	0.4	0.2	0.2	0.4	0.4	0.2	0.3	0.3	0.1	0.6
7/29	0.3	0.4	0.4	0.6	0.4	0.1	0.2	0.4	0.5	0.1	0.3	0.3	0.1	0.6
7/30	0.3	0.3	0.3	0.6	0.4	0.2	0.2	0.5	0.3	0.1	0.3	0.3	0.1	0.6
7/31	0.2	0.3	0.5	0.6	0.6	0.2	0.2	0.4	0.3	0.1	0.4	0.3	0.1	0.6
8/1	0.3	0.3	0.4	0.5	0.6	0.2	0.2	0.5	0.3	0.1	0.4	0.3	0.1	0.6
8/2	0.3	0.2	0.5	0.4	0.6	0.3	0.2	0.4	0.3	0.1	0.4	0.3	0.1	0.6
8/3	0.3	0.3	NA	0.4	0.6	0.3	0.2	0.4	0.2	0.1	0.5	0.3	0.1	0.6
8/4	0.2	0.3	0.4	0.4	0.7	0.3	0.2	0.3	0.3	0.2	0.4	0.3	0.1	0.7
8/5	0.2	0.3	0.5	0.4	0.7	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.2	0.7
8/6	0.3	0.3	0.3	0.4	0.7	0.3	0.2	0.3	0.3	0.1	0.4	0.3	0.1	0.7
8/7	0.3	0.4	0.3	0.4	0.7	0.3	0.2	0.3	0.3	0.2	0.6	0.3	0.1	0.7
8/8	0.2		0.4	0.4	0.6	0.3	0.3	0.3	0.3	0.2	0.5	0.3	0.1	0.6
8/9		0.3	0.5	0.3	0.6	0.3	0.3	0.2	0.3	0.2	0.6	0.3	0.2	0.6
8/10		0.4	0.4	0.3	0.5	0.2	0.3	0.2	0.4	0.2	0.5	0.3	0.1	0.5
8/11	0.3	0.3	0.4	0.2	0.5	0.2	0.3	0.2	0.4	0.1	0.6	0.3	0.1	0.5
8/12	0.3	0.4	0.4	0.2	0.3	0.2	0.3	0.2	0.4	0.1	0.5	0.3	0.1	0.4
8/13	0.3	0.4	0.4	0.2	0.3	0.1	0.2	0.2	0.4	0.1	0.6	0.2	0.1	0.4
8/14	0.2	0.5	0.5	0.1	0.4	0.2	0.2	0.2	0.3	0.2	0.5	0.2	0.1	0.5
8/15	0.2	0.4	0.6	0.1	0.4	0.2	0.2	0.2	0.5	0.2	0.6	0.3	0.1	0.6
8/16	0.2	0.4	0.6	0.1	0.4	0.2	0.2	0.2	0.5	0.2	0.4	0.3	0.1	0.6
8/17	0.2	0.4	NA	0.1	0.3	0.2	0.2	0.2	0.5	0.2	0.5	0.2	0.1	0.5
8/18	0.2	0.3	0.5	0.1	0.3	0.2	0.2	0.2	0.5	0.2	0.4	0.2	0.1	0.5
8/19	0.2	0.4	0.4	0.2	0.5	0.2	0.2	0.2	0.5	0.2	0.6	0.2	0.1	0.5
8/20	0.2	0.3	0.3	0.1	0.7	0.2	0.2	0.3		0.2	0.5	0.2	0.1	0.7
8/21	0.2	0.3	0.3	0.2	0.7	0.3	0.2			0.2	0.6	0.3	0.1	0.7
8/22	0.2	0.2		0.2	0.5	0.2	0.2			0.2	0.6	0.2	0.1	0.5
8/23	0.2	0.3		0.1	0.9	0.3	0.2			0.3	0.6	0.3	0.1	0.9
8/24	0.2			0.1	0.9	0.2	0.2			0.3	0.6	0.3	0.1	0.9
Average	0.3	0.3	0.4	0.6	0.5	0.4	0.5	0.5	0.4	0.2	0.5	0.4	0.1	1.0
Min.	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.4
Max.	0.9	0.7	0.7	1.3	1.1	1.2	1.2	1.2	0.7	0.4	1.4	0.6	0.3	1.8

Note: The value entered is the largest value for the day. Blank space indicates no observation taken.